

# SALMONELLA TYPHIMURIUM INFECTION IN A COMMERCIAL RABBITRY

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**Abstract** - Clinical features, therapy and lesions of an acute salmonellosis outbreak in a commercial rabbitry are described.

Environmental monitoring and epidemiological studies have also been performed to identify infection sources, and abdominal muscles and gallbladders have been examined to judge about meat sanitary status.

Mice trapped inside the farm, that resulted *S.typhimurium* positive, appear to be as infection sources.

The infection caused, during 20 days, a 40% mortality among fattening rabbits, whereas among does the pregnancy rate decreased from 83,5% to 59% and the abortion rate rose from 2% to 10%.

Bacteriological examination of muscles and gallbladders gave negative results, but the continuous environmental positivity makes further investigations in clinically healthy rabbits necessary to identify carriers that could contaminate the processing plant.

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## INTRODUCTION

During the last decade rabbit intensive rearing developed much more than the traditional one. A reduction in diseases primary agents (able to cause a disease even without predisposing factors) has been obtained in farms by means of a more rational feeding and a higher hygiene level. On the other hand, overcrowding and stress due to the very hard alimentary program have caused the spreading of secondary infections by means of environmental factors that weaken animal defences (6).

With better environmental conditions the number of salmonellosis outbreaks has decreased, as the absence of recorded cases in WRSA Congresses proceedings, from 1976 to 1982, demonstrates (1) (2) (3) (4) (5).

However some Authors report the presence of this disease, and the risk related to these sporadic outbreaks becomes more serious because of the high number of involved animals (10) (11) (12).

Farms and slaughterhouses monitoring is so necessary to be able to notify this zoonosis, as stated by EEC and Italian legislation (Directive 117/92/EEC and D.P.R. 559/92).

An acute salmonellosis outbreak in a commercial rabbitry of 420 does is described.

The case has been notified to the Public Veterinary Service, clinically monitored and submitted to adequate treatment. An epidemiological study has been carried out. Environment as well as slaughtered animals coming from batches contaminated during the weaning period have been monitored, to identify carriers that could contaminate the slaughtering line and threaten meat sanitary status.

## MATERIAL AND METHODS

Because of the sudden appearance of abortion cases (2% of dead animals per day) and of mortality among does pregnant from 20-25 days (2,5% of dead animals per day) and among rabbits during weaning (1,5-2% of dead animals per day), bacteriological exams have been performed. These exams resulted in the isolation of *Salmonella typhimurium*.

Treatments and laboratory examinations went on as follows:

### Clinical features and therapy

20/09/95 - oral administration of an antibiotic for 4 days, with no results

05/09/95 - oral administration of an antibiotic association for 4 days, with no results

22/10/95 - 1000 rabbits were transferred from the infected does unit to the fattening unit, still *Salmonella* negative, with a subsequent mortality increase from 0,1 to 3% of dead animals per day.

25/10/95 - oral enrofloxacin administration for 4 days both in does and fattening unit, with poor results.

27/10/95 - bacteriological examination of dead rabbits positive for *S.typhimurium*. Performance of an antibiotic susceptibility test.

10/11/95 - oral administration of flumequine for 4 days with good results, rodents control and disinfection of walls and floors with 1,5% cresol and 0,02% glutaraldehyde and cages disinfection with 1% iodine.

22/11/95 - mortality decreased to acceptable levels (0,2% of dead fattening rabbits per day). Dead animals were *Salmonella* negative.

04/12/95 - new increase in mortality rates with bacteriological positivity for *Salmonella* in all dead rabbits examined in different units. Antibiotic susceptibility test on the isolated strain.

12/12/95 - flumequine oral administration for 4 days and one gentamycin subcutaneous injection both in does and in fattening rabbits. The treatment was repeated after 14 days.

09/01/96 - normal mortality rates but persistence of bacteriological positivity for *Salmonella* in weaning and fattening dead rabbits and in does.

### **Epidemiological study**

The epidemiological study has been performed by means of water, feed (feeders and silos) and trapped mice analysis.

### **Farm environmental monitoring**

03/11/95 - cages, walls and fans swabbing

22/11/95-04/12/95-09/11/95 - cages, nests, walls and fans swabbing

### **Monitoring after slaughtering**

08/01/96 - 5 muscle patches from the abdominal region were sampled from 5 slaughtered rabbits and 50 gallbladders from 50 slaughtered rabbits from a batch of 400 animals that had been submitted to antibiotic treatment after weaning.

### **Laboratory procedure**

All samples have been immediately transported to Istituto Zooprofilattico at fridge temperature.

a) non-selective enrichment in buffered peptone water:

25 grams of abdominal muscles in 225 ml

other samples and swabs in 50 ml

Incubation at 37°C for 24 hours.

b) selective enrichment: 0,1 ml of the incubated BPW was used to inoculate 10 ml of Rappaport Vassiliadis Soya Peptone broth (RVS). Incubation at 41,5°C for 24 hours.

c) selective agar: a loopful of the incubated RVS was streaked on XLD agar. Incubation at 37°C for 24 hours.

d) presumptive isolated colonies were transferred into Kligler Iron Agar slants and incubated at 37°C for 24 hours.

e) biochemical tests and serological typing.

## **RESULTS AND DISCUSSION**

Clinical features and different treatments animals have been submitted to demonstrate that salmonellosis in a rabbitry is not an easy-to-solve problem.

Clinical signs and lesions correspond to other Authors description: yellowish diarrhoea, dehydration and weight loss, enteritis with cecum and colon necrotic foci, spleen enlargement, dilated gallbladder with foci of necrosis, and bronchopneumonia in suckling young.

During the epidemiological study *S.typhimurium* has been isolated from trapped mice and from feed collected from feeders, whereas water and feed from silos were negative. So mice are probably responsible for salmonella introduction in the does unit following feeders contamination and for subsequent infection spreading.

In fattening unit instead the disease has been introduced with infected weaned animals coming from the does unit.

Oral treatment has been demonstrated to be not sufficient to control mortality for a long period, but only repeating disinfection and therapy both orally and by injection mortality rate has been lowered to an acceptable level.

Environmental bacteriological monitoring, instead, has always been positive for *S.typhimurium*; this could justify the presence in the farm of animals dying for salmonellosis even after many antibiotic treatments (table 1).

In this farm the consequences of the disease have been serious: during the infection, in 20 days, 40% of fattening rabbits died, whereas in the does unit the pregnancy rate decreased from 83,5% to 59% and the abortion rate rose from 2% to 10%.

Anyway salmonellosis in rabbits is not only an economic damage but also a danger for meat sanitary status.

In previous surveys in slaughterhouses *Salmonella spp.* had been found in rabbits, but this isolation hadn't been confirmed during farm environmental monitoring. This fact led to the hypothesis of transport cages and processing line cross-contamination (7) (9).

Because of these results, in this salmonellosis outbreak the importance not only of clinical features, but also of the sanitary status of meat deriving from healthy animals reared in a contaminated environment, has been stressed. So after slaughtering monitoring has been performed on either carcasses and gallbladders of rabbits that had developed clinical salmonellosis during the weaning period.

Even if *Salmonella typhimurium* hasn't been isolated during this monitoring, further investigations in healthy rabbits, ready to be slaughtered, become necessary because of the continuous presence of this agent in the farm. This research is aimed to outline the presence of carriers, that could contaminate the processing plant.

The low incidence of salmonellosis in commercial rabbitries must not cause a reduction in the attention toward this zoonosis, but must instead lead to an implementation in checking farm forms (8), that should be filled in for each batch to slaughter. Such a control allows the performance of bacteriological controls both in slaughterhouses and in farms, whenever mortality rates induce to suspect a *Salmonella* infection.

Antibiotic treatments reduce mortality but usually are not effective in eradicating *Salmonella*. Farms must so be monitored also when clinical signs are no more evident, to identify a possible *Salmonella* persistence.

Furthermore the development of meat rabbit intensive rearing must stimulate a stronger sanitary monitoring of these farms, to avoid *Salmonella* infection to spread as in other production chains.

**Table 1: Farm environmental monitoring**

sampling site	1° sample	2° sample	3° sample	4° sample
	03/11/95 during infection with clinical signs	22/11/95 after treatment and disinfection	04/12/95 after clinical signs reappearance	09/01/96 after treatment and disinfection
cages	+	+	-	-
nests	not performed	+	+	-
walls	+	-	-	+
fans	not performed	+	-	+

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**Infezione da *salmonella typhimurium* in un allevamento intensivo di conigli da carne** - In un episodio di salmonellosi acuta in conigli da carne è stato seguito l'andamento clinico e terapeutico in allevamento e sono state descritte le lesioni anatomiche patologiche.

Sono stati inoltre eseguiti monitoraggi ambientali ed indagini epidemiologiche, per svelare le fonti di infezione, ed analisi di lembi muscolari e cistifellee di conigli macellati, per valutare l'aspetto igienico-sanitario delle carcasse.

I topi catturati in allevamento, positivi per *Salmonella typhimurium*, sembrano essere i responsabili dell'insorgenza dell'infezione che ha provocato, in 20 giorni, la mortalità del 40% dei conigli all'ingrasso mentre nel reparto fattrici la percentuale di gravidanza è diminuita dall'83.5% al 59% e la percentuale di aborto è aumentata dal 2% al 10%.

Le analisi di laboratorio di lembi muscolari e delle cistifellee, per valutare l'aspetto igienico-sanitario delle carcasse macellate, sono risultate negative, ma la continua positività dei monitoraggi ambientali rende necessarie ulteriori indagini, nei conigli clinicamente sani, per evidenziare eventuali portatori sani che potrebbero inquinare il macello.