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EXPERIMENTAL FIELD VACCINATION AGAINST ROTAVIRUS ENTERITIS IN GROWING RABBITS

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I - INTRODUCTION

The Rotavirus belongs to the family of Reoviridae. They lack an envelope and so can be resistant to the disinfectants.
They infect mainly the enterocytes destroying the intestinal villi (CASTRUCCI 1988).
Different serotypes have been isolated in practically all of the animal species.

Rotavirus infection in the young rabbit has often been described either as a cause of severe enteritis or as the origin of transitory subclinical diarrhoeas (MORISSE 1982; NAGY et al. 1988; DI GIACOMO et THOULESS 1986; KUDRON et al. 1982; SCHOEB et al. 1986).

Normally, this infection concerns mainly the 50 to 60 day old rabbits (CAMMARATTA et al. 1988).
These is very little information available on the possibility to vaccinate against this disease.

Presented in this work are experimental results obtained with an oral vaccine normally used against the Rotavirus in calves.

II - MATERIAL AND METHODS

a) Type of used vaccin

In these trials rabbits were vaccinated against Rotavirus using on oral vaccine produced by the prophylactic Institute of Padova and normally used for calves at a dose of 3 cc. for a 50 kg calf. A flask label of this vaccine is shown in the Figure 1.

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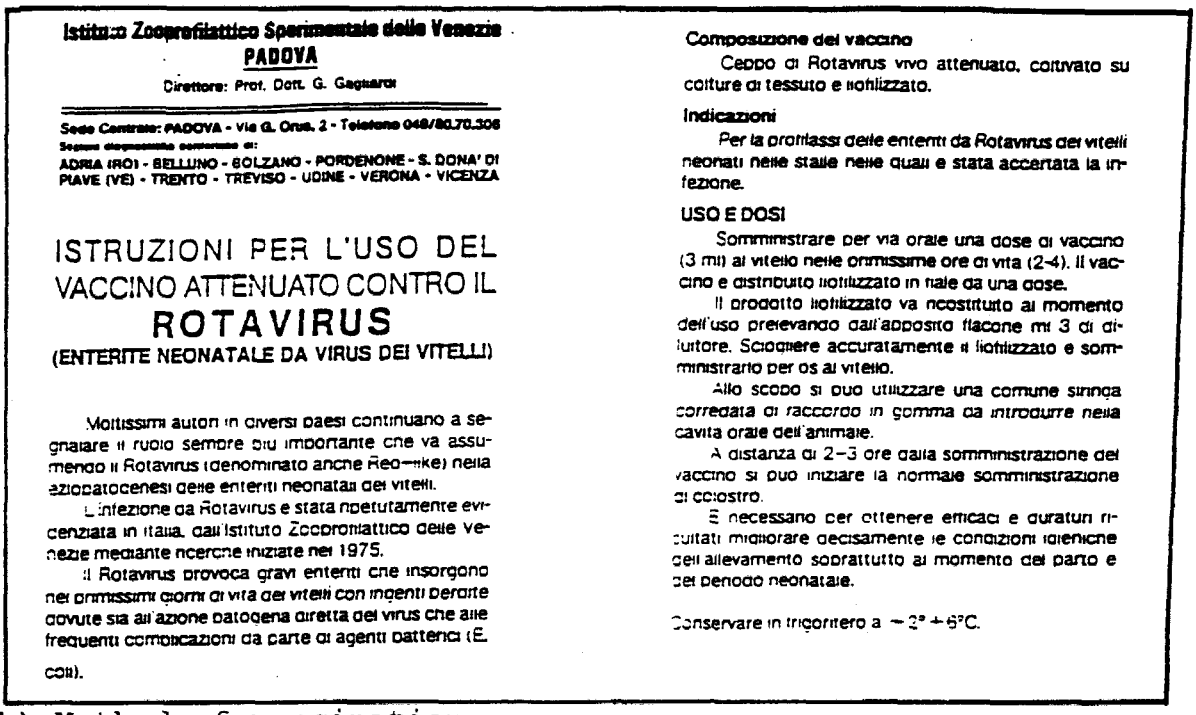
FIGURE 1 : VACCIN FLASK TAG



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ISTRUZIONI PER L'USO DEL VACCINO ATTENUATO CONTRO IL
ROTAVIRUS
(ENTERITE NEONATALE DA VIRUS DEI VITELLI)

Moltissimi autori in diversi paesi continuano a segnalare il ruolo sempre più importante che va assumendo il Rotavirus (denominato anche Reo-like) nella eziopatogenesi delle enteriti neonatali dei vitelli.

L'infezione da Rotavirus è stata ripetutamente evidenziata in Italia, dall'Istituto Zooprofilattico delle Venezie mediante ricerche iniziate nel 1975.

Il Rotavirus provoca gravi enteriti che insorgono nei primissimi giorni di vita dei vitelli con ingenti perdite dovute sia all'azione patogena diretta del virus che alle frequenti complicazioni da parte di agenti batterici (E. coli).

Composizione del vaccino

Ceppo di Rotavirus vivo attenuato, coltivato su colture di tessuto e liofilizzato.

Indicazioni

Per la profilassi delle enteriti da Rotavirus dei vitelli neonati nelle stalle nelle quali è stata accertata la infezione.

USO E DOSI

Somministrare per via orale una dose di vaccino (3 ml) al vitello nelle primissime ore di vita (2-4). Il vaccino è distribuito liofilizzato in fiale da una dose.

Il prodotto liofilizzato va ricostituito al momento dell'uso prelevando dall'apposito flacone ml 3 di diluitore. Sciogliere accuratamente il liofilizzato e somministrarlo per os al vitello.

Allo scopo si può utilizzare una comune siringa corredata di raccordo in gomma da introdurre nella cavità orale dell'animale.

A distanza di 2-3 ore dalla somministrazione del vaccino si può iniziare la normale somministrazione di colostro.

È necessario per ottenere efficaci e duraturi risultati migliorare decisamente le condizioni igieniche dell'allevamento soprattutto al momento del parto e del periodo neonatale.

Conservare in frigorifero a −2° +6°C.

b) Method of vaccination

This vaccine was distributed following 2 different methods:
* the collective one
* the single one

Collective method

One 3 cc. dose of the oral vaccine was diluted in 1.5 liters of drinking water distributed to fifty rabbits ranging between 45 and 50 days of age. This means an intake of 30 cc. of diluted solution of vaccine for each rabbit which is generally consummed in less than one hour.

Single method

One 3 cc. dose of oral vaccine was diluted in 47 cc of a commercial vitamin energy supplement (Vitatox FATRO SpA - OZZANO DELL'EMILIA - BO - ITALY) (characteristics on table 1).
One cc of this solution was given orally and individually to "the experimental rabbits".

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TABLE 1 - **CHARACTERISTICS OF THE VITAMIN SOLUTION**

For 250 ml of solution

Vitamin A	100,000	UI
Vitamin D2	500,000	UI
Vitamin B1	0.10	g
Vitamin C	2	g
Vitamin PP	0.3	g
Carphorsulphonate of sodium	2	g
Sorbitol	12.5	g
Glucose	12.5	g

Type of trials carried out

First part

At the beginning, four trials were carried out in several commercial large rabbit farms in the Venetian area (North East of Italy) (from 300 to 2000 does). One trial (Trial 1) was carried out according to the collective method, two trials (Trials 2-3) according to the individual method and the fourth partly according to the individual method, and partly to the collective one. In each trial, a control group of rabbits was not vaccinated.

Trial 1 150 rabbits (47 day old) were vaccinated according to the collective method and introduced into Rotavirus infected room (high mortality on the rabbits living in this room).

Trial 2 150 apparently healthy rabbits (55 day old), living in a Rotavirus infected room, and showing first symptoms of diarrhoea, were vaccinated orally and individually.

Trial 3
An individual vaccination was given to 50 rabbits (55 day old), among a population of 270 rabbits which had a high level of mortality due to diarrhoea.

Trial 4
Rotavirus infection was diagnosed by immunofluorescence before beginning the trial.
A high mortality, associated with an abundant diarrhoea, began as soon as the rabbits reached 50 days of age.

800 of these rabbits were included in the trial:

* 100 as a control
* 300 were vaccinated according to the collective method
* 400 were vaccinated according to the individual method

Second part

In a second experiment, in four other farms, 2050 rabbits were vaccinated either individually or collectivly according to the previously described methods.
These different trials were carried out over a period of 8 months from November 1989 to July 1990.
These different trials are summarized on the table 2.

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TABLE 2 **TRIALS OF VACCINATION AGAINST RABBIT ROTAVIRUS INFECTION**

NUMBER OF THE TRIAL	NUMBER OF ANIMALS	AGE OF THE RABBITS (DAYS)	CHARACTERISTICS OF THE VACCINATED RABBITS	TYPE OF VACCINATION OUT
		FIRST PART		
1	150	47	INTRODUCED HEALTHY RABBITS IN A ROTAVIRUS INFECTED ROOM	COLLECTIVE
2	150	55	APPARENTLY HEALTHY RABBITS LIVING IN A ROTAVIRUS INFECTED ROOM	INDIVIDUAL
3	50	55	APPARENTLY HEALTHY RABBITS AMONG A POPULATION OF 270 INFECTED RABBITS (HIGH MORTALITY)	INDIVIDUAL
4	800	50	ROTAVIRUS INFECTED RABBITS (CONFIRMED BY IMMUNOFLUORESCENCE) WITH EARLY SIGNS OF DIARRHOEA	* 100 RABBITS AS A CONTROL * 300 RABBITS COLLECTIVELY VACCINATED * 400 INDIVIDUALLY VACCINATED
		SECOND PART		
5-6-7	2050	47-52		EITHER INDIVIDUALLY OR COLLECTIVELY

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III - RESULTS

Generally, morbidity and mortality were very high in the control group: the morbidity measured by the presence of serous mucous diarrhoeas, were never below 80%. Mortality was always over the 25% level and in some cases higher (till 78% in the fourth trial) (Table 3).

At the same time, in the first four trials no mortality was observed for the vaccinated rabbits, even for the trials where the control group mortality was the higher. (Table 3). Among the 2050 vaccinated rabbits involved in the four last trials, there were only 32 (1.6%) deaths.
When placed closely to rotavirus infected rabbits, the individually vaccinated rabbits did not demonstrate any symptoms of diarrhoea. Rabbits showing signs of diarrhoea at the time of vaccination were observed to be clinically cured with 24 hours.

Some cases of diarrhoea were observed for the collectively vaccinated rabbits but in all the cases, the rabbits spontaneously recovered.
It has to be emphasized that during the second part (Trials on a large number of animals) the vaccination enabled us to recover a normal situation in a farm where the Rotavirus had already caused the death of more than 800 rabbits.

TABLE 3: **RESULTS OF MORTALITY**

NUMBER OF THE TRIAL	NUMBER OF VACCINATED RABBITS	NUMBER OF DEATH VACCINATED RABBITS	PERCENTAGE OF MORTALITY FOR THE CONTROL (%)
1	150	0	(1)
2	150	0	(1)
3	50	0	25
4	700	0	78
5-6-7-8	2050	32	25 to 78

(1) Data not available

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IV - DISCUSSION AND CONCLUSIONS

Our results tended to demonstrate that under field-test conditions the use of a vaccin against the Rotavirus strongly decreased the incidence of diarrhoea and the mortality by enteritis, as it has already been shown in the calf (FREMONT 1983; FRIGERI et al. 1988). It means that the vaccin against Rotavirus in calves, divulged by the Zooprophylactic Institute of Padova has the capacity of interference and/or induction of local immunity against the Rotavirus in the rabbit.

This can be explained by the results of recent research which have found some antigenic analogies between Rotavirus isolated from rabbits and from calves. It has been demonstrated that new-born calves can be infected with Rotavirus isolated from rabbit intestines (CASTRUCCI 1988).

These observations agree with those of CAMMARATA et al. (1988) considering that Rotavirus is often involved in the diarrhoeas in the North Italy rabbits farms. These authors have observed that the accute form of the disease generally takes place between 50 and 60 days of age.

In this sense, it has been suggested that one unique type of digestive Rotavirus may exist able to infect different animal species, even if there are some differences at the antigenic level and therefore for the immunogenic response.

In conclusion, these trials show that rotavirus is one of the infectious agents involved in the enteritis complex as already mentionned by SINKOVICS (1984) and that a vaccinal prophylaxis can solve at least a part of the problems of certain diarrhoeas and mortality by enteritis.

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SUMMARY

Rotavirus infection has often been described as a cause of enteritis in the growing rabbit.
To study the possibility to develop a therapy against this disease, 8 trials were carried out, vaccinating rabbits with an oral vaccine produced by the Zooprophylactic Institute of Padova for calves.

This oral vaccine was given either collectively as a prevention, or individually generally after the appearance of the first symptoms of diarrhoea in the rabbitry.
The different trials commercial rabbit farms took place in large commercial rabbit farms in the Venetian area (North-East of Italy).

In the first four trials, 1200 vaccinated rabbits were compared to a control of non-vaccinated.
In the following trials, all the 2050 rabbits were vaccinated to study their health state and their mortality.

In these trials, no mortality was observed for the vaccinated rabbits even when the mortality of the non vaccinated rabbits was very high. (From 25 to 78%).

At the same time the vaccinated rabbits demonstrated little or not symptoms of diarrhoeas.

These trials have confirmed that the Rotavirus is one of the infections agents of the enteritis complex in rabbits and that a vaccinal prophylaxis can solve at least a part of the problems of diarrhoeas and mortality caused by enteritis.

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