



Coccidiosis management at farm level : in parallel to classical coccidiostatic, which alternatives?

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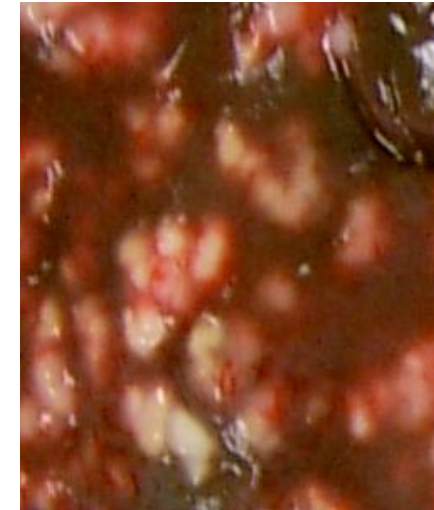
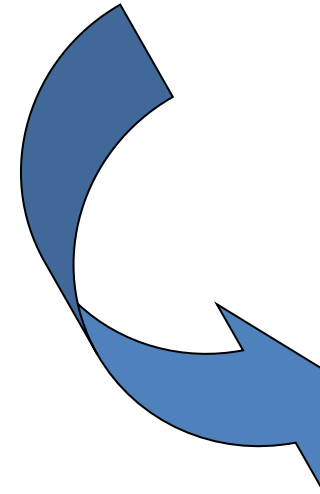
IMPORTANCE OF THE DISEASE

- ▶ There are two types of coccidiosis in rabbits.
 - ▶ **Hepatic coccidiosis** due to *Eimeria stiedai*, rare in rational breeding,
 - ▶ and **other coccidiosis** due to *Eimeria*, much more frequent .
 - ▶ These all have an action on the digestive tract



LESIONS DUE TO HEPATIC COCCIDIOSIS

- ▶ In **hepatic coccidiosis**, the liver is punctuated with more or less regular yellowish-white spots.
- ▶ They are due to an accumulation of oocysts (eggs) of coccidia in the **bile ducts** causing their **thickening** then their **fibrosis** and their **secondary colonization** by **leukocytes** (white blood cells).



HEPATIC COCCIDIOSIS DIAGNOSIS

- ▶ The rabbit is not actually expressing **any symptoms**.
- ▶ In the most affected rabbits, **blood chemistry tests** may reveal hepatic cytolysis (destruction of liver cells). The white blood cell count may also increase.
- ▶ This is an necropsy "find".
- ▶ **Differential diagnosis** :
 - ▶ small abscesses or granulomas located on the liver
 - ▶ Sample from one of the spots, or better, in the gallbladder and bile ducts, to observe the oocysts under a microscope.

WHAT ARE THE SYMPTOMS OF INTESTINAL COCCIDIOSIS?

- ▶ **ADG** down
- ▶ **Diarrhea**
- ▶ **Mortality**
- ▶ Function of the coccidia species found



	Species of Eimeria	ADG down	Diarrhea	Mortality
Non pathogenic	<i>coecicola</i>			
Little pathogenic	<i>perforans</i>	+		
pathogenic	<i>exigua</i>	++		
pathogenic	<i>media</i>	++		
pathogenic	<i>magna</i>	++	++	+
pathogenic	<i>irresidua</i>	++	++	+
pathogenic	<i>piriformis</i>	++	+++	+++
Very pathogenic	<i>intestinalis</i>	+++	+++	+++
Very pathogenic	<i>flavescens</i>	+++	+++	+++

IMPORTANCE OF THE DISEASE

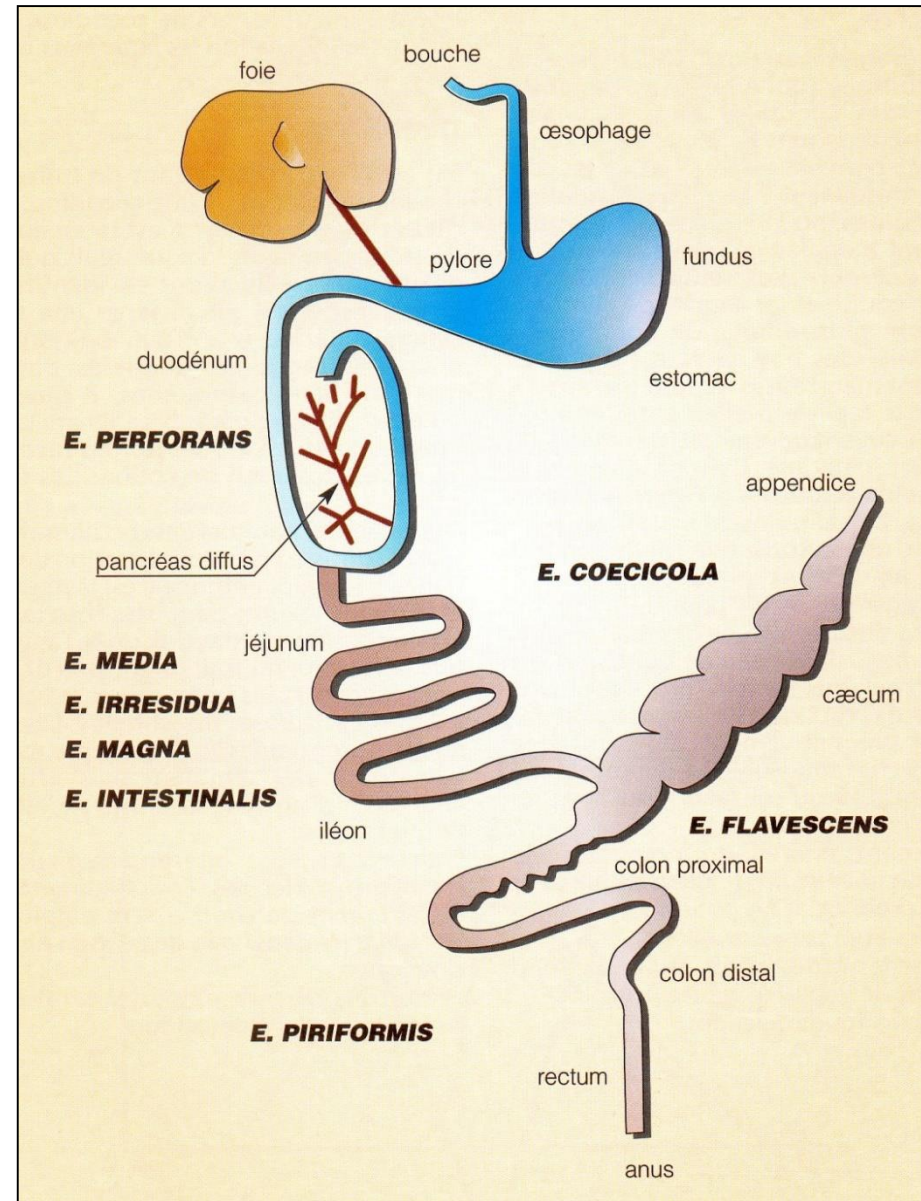
- ▶ The form of the disease is also linked
 - ▶ in the middle of life and the rabbit strain
 - ▶ Usually absent in SPF (Specific Pathogenic Free)
 - ▶ Little present in pet rabbits
 - ▶ Very present in rabbits in straw hutches, organic rabbits and so on
 - ▶ At the age
 - ▶ Clinical coccidiosis is never seen in adults.
 - ▶ To its environment
 - ▶ Very contagious disease, oocysts can remain for many months on cages (mesh wire or floors) and equipment (feeders)



- ▶ Coccidiosis only develops
 - ▶ If the parasite is present
 - ▶ If the rabbit is stressed
- ▶ There are many causes of stress :
 - ▶ Physical aggression (transport, heat, noise, cold, change of cage, sudden change in temperature, thunderstorm, etc.)
 - ▶ Chemical aggression (air with harmful gases, inappropriate drugs, etc.)
 - ▶ Biological aggression (weaning, ambient microbism, secondary infection, etc.)
 - ▶ Psychological aggression (fear due to rodents running around in the cages, unusual visits, mixing of litters at weaning, and so on).
- ▶ During the development of one of these assaults, an immediate imbalance is created. We speak of immediate primary shock.



PREFERENTIAL MULTIPLICATION ZONES



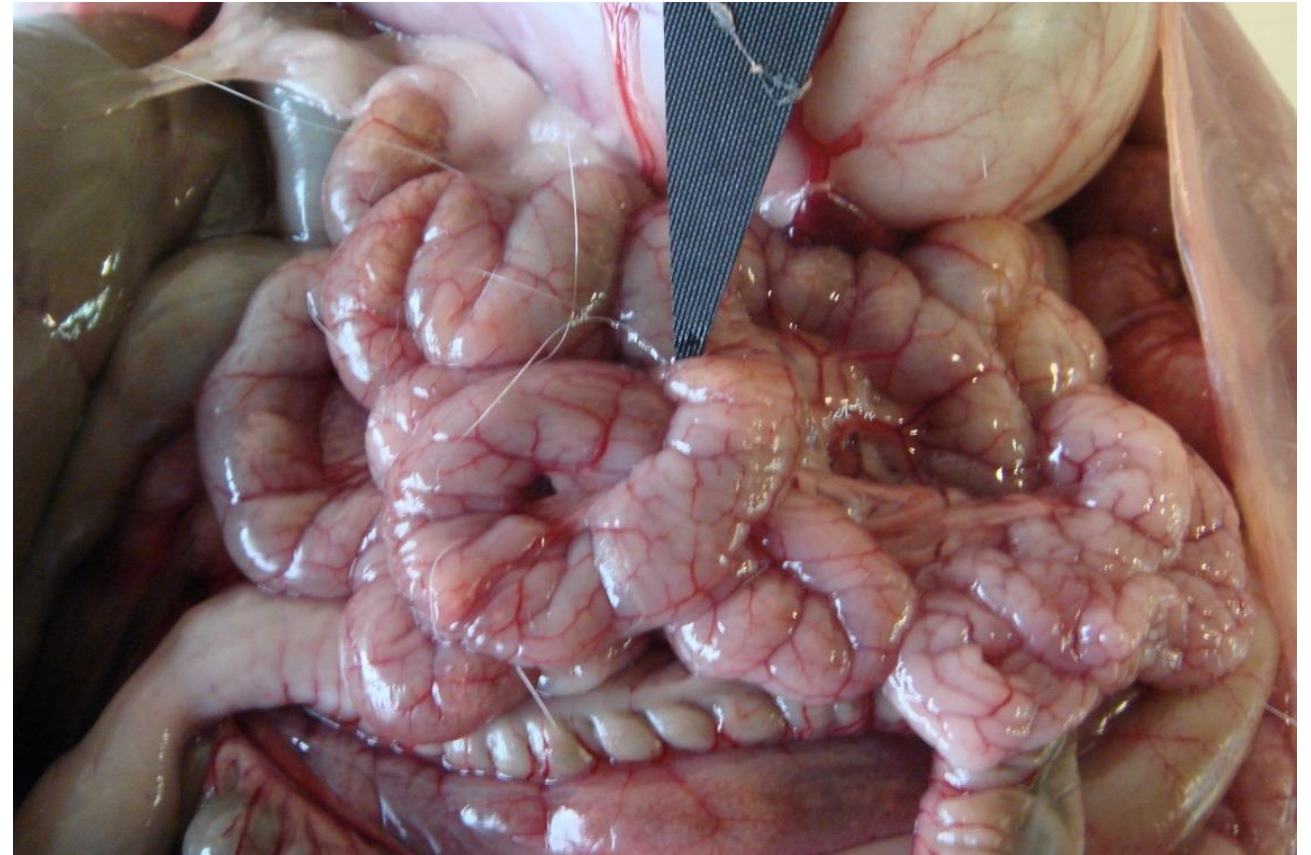
LESIONS OF INTESTINAL COCCIDIOSIS

- ▶ Rabbits with **intestinal coccidiosis** sometimes show diarrhea and / or simple **growth retardation**
- ▶ Examination of the intestine shows **liquid content** and sometimes - depending on the species of parasites - damage to the intestine
- ▶ These signs are also seen in many other intestinal diseases.

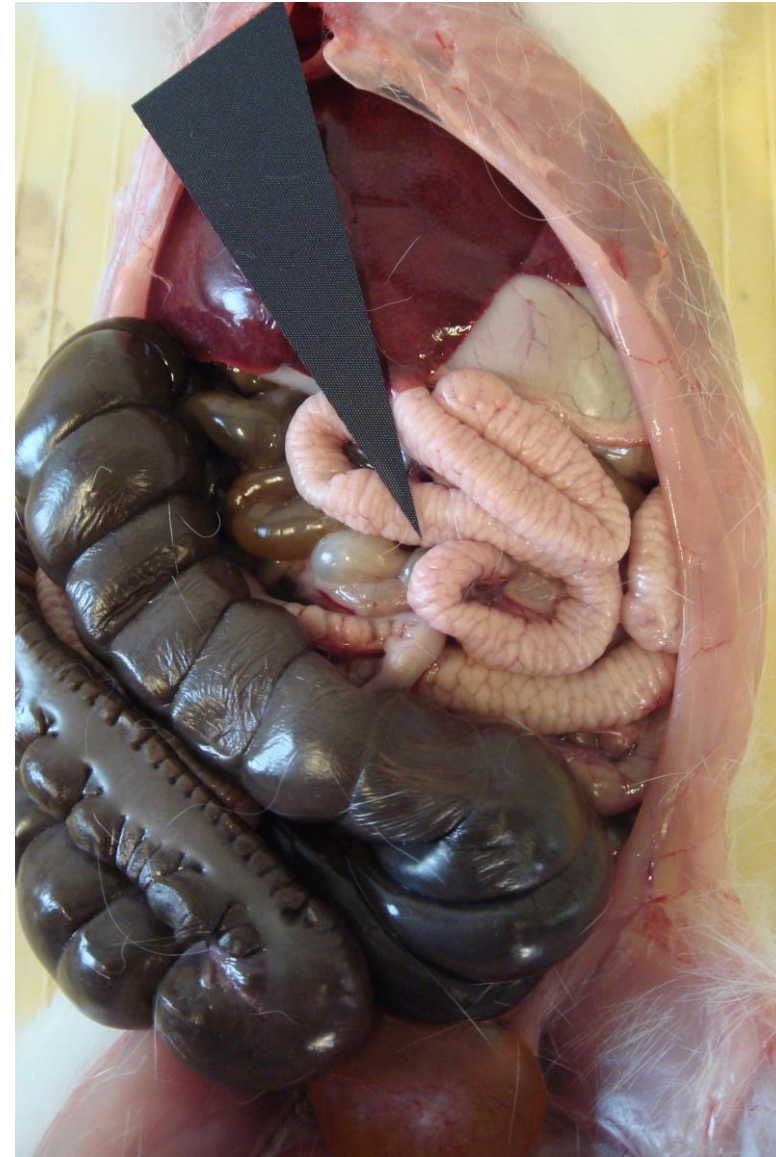


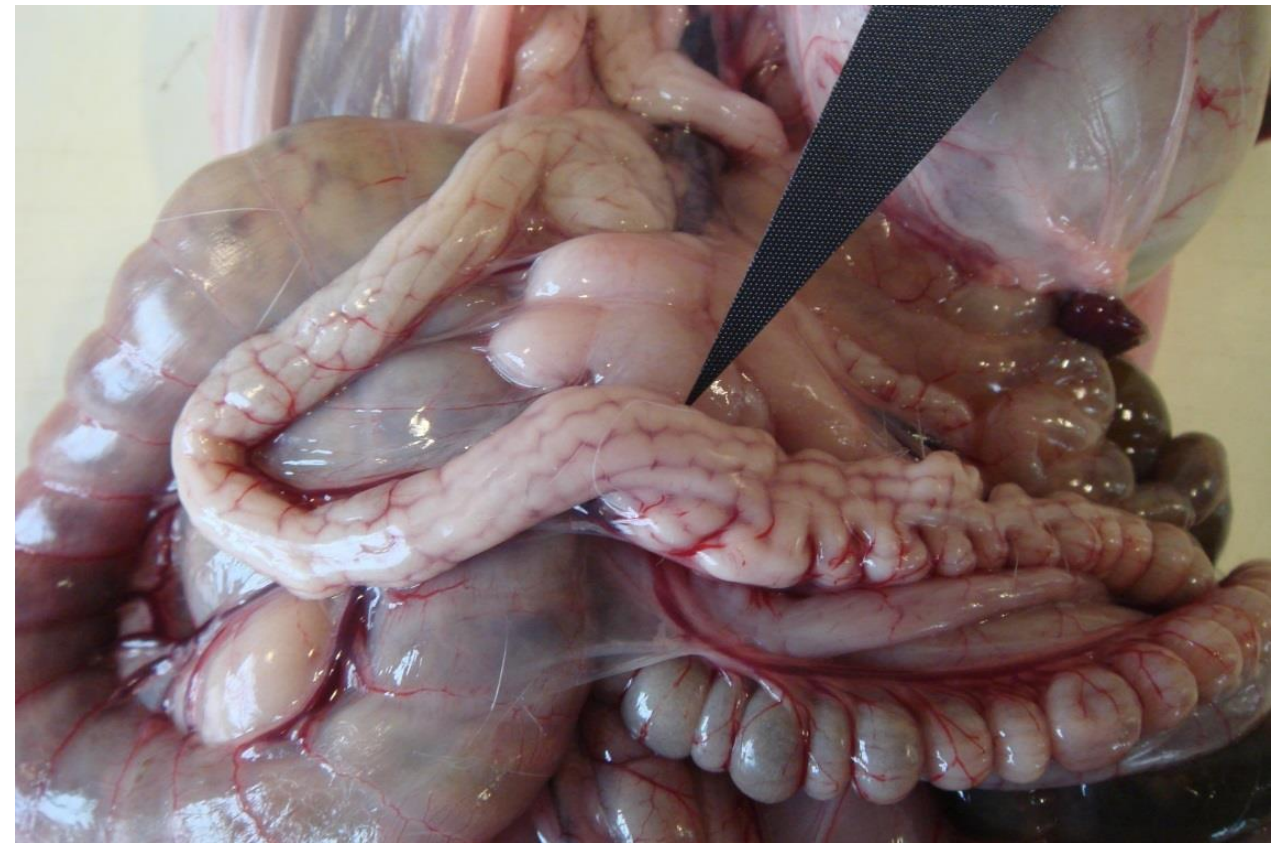
DUODENUM DAMAGE : *E. PERFORANS*, *MEDIA*, *IRRESIDUA*





ILEUM DAMAGE : *E. INTESTINALIS*



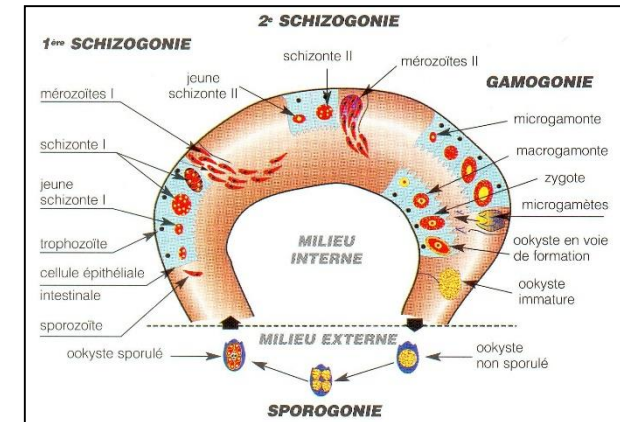


DAMAGE TO THE COLON: *E. PIRIFORMIS*



PARASITE CYCLE

▶ IT INCLUDES TWO PHASES



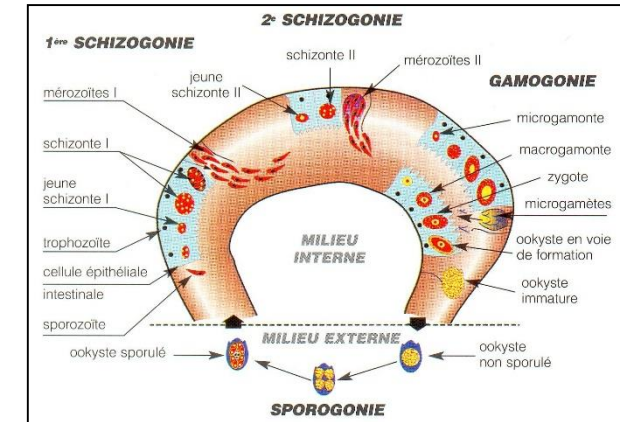
▶ External phase :

- ▶ The parasitized rabbit rejects immature oocysts (non-infesting) in the **external environment** through its droppings.
- ▶ Under the desired conditions of temperature, oxygenation and humidity, the oocyst **sporulates** and contains eight **sporozoites**.
- ▶ It becomes infesting.
- ▶ Sporulation takes place in 30 to 60 hours under good conditions.
- ▶ A sporulated oocyst is **extremely resistant** (its destruction can be achieved by steaming at 120 ° C).

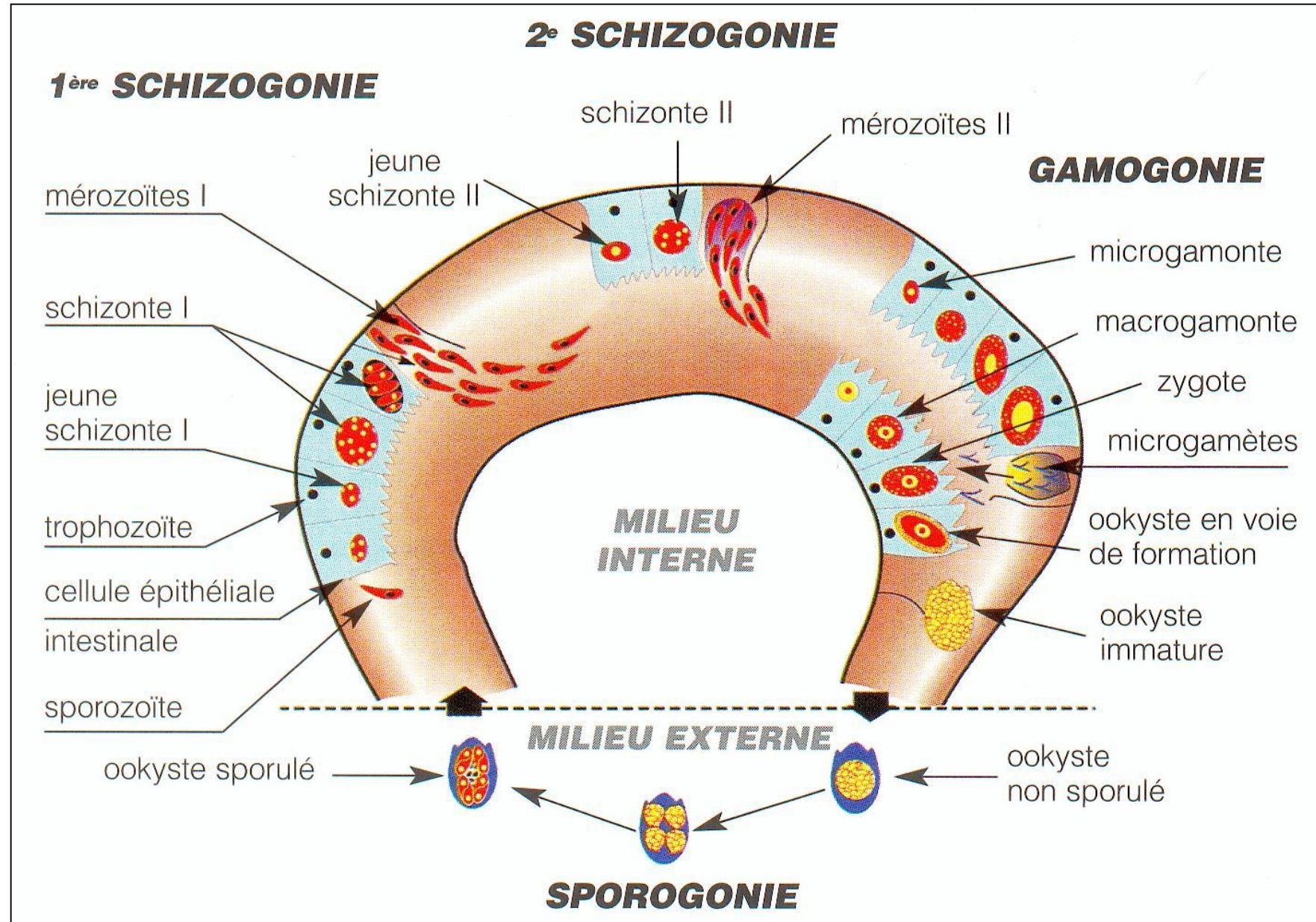
PARASITE CYCLE

► Internal phase :

- If a rabbit ingests these sporulated oocysts, it **becomes infested**.
- The sporulated oocyst is lysed in the stomach and the **sporozoites are released**.
- Then they **migrate** to the intestine.
- A single oocyst from *E. intestinalis* can produce **3 million oocysts** at the end of the cycle.
- We first observe one to four asexual multiplications called **schizogonias**.
- Each multiplication lasts approximately 48 hours. Then, during the **sexual phase** (or gamogony), an egg (or zygote) and microgametes are formed which will unite to form an immature oocyst.
- These phases take place in the cells of the intestine which are destroyed over time

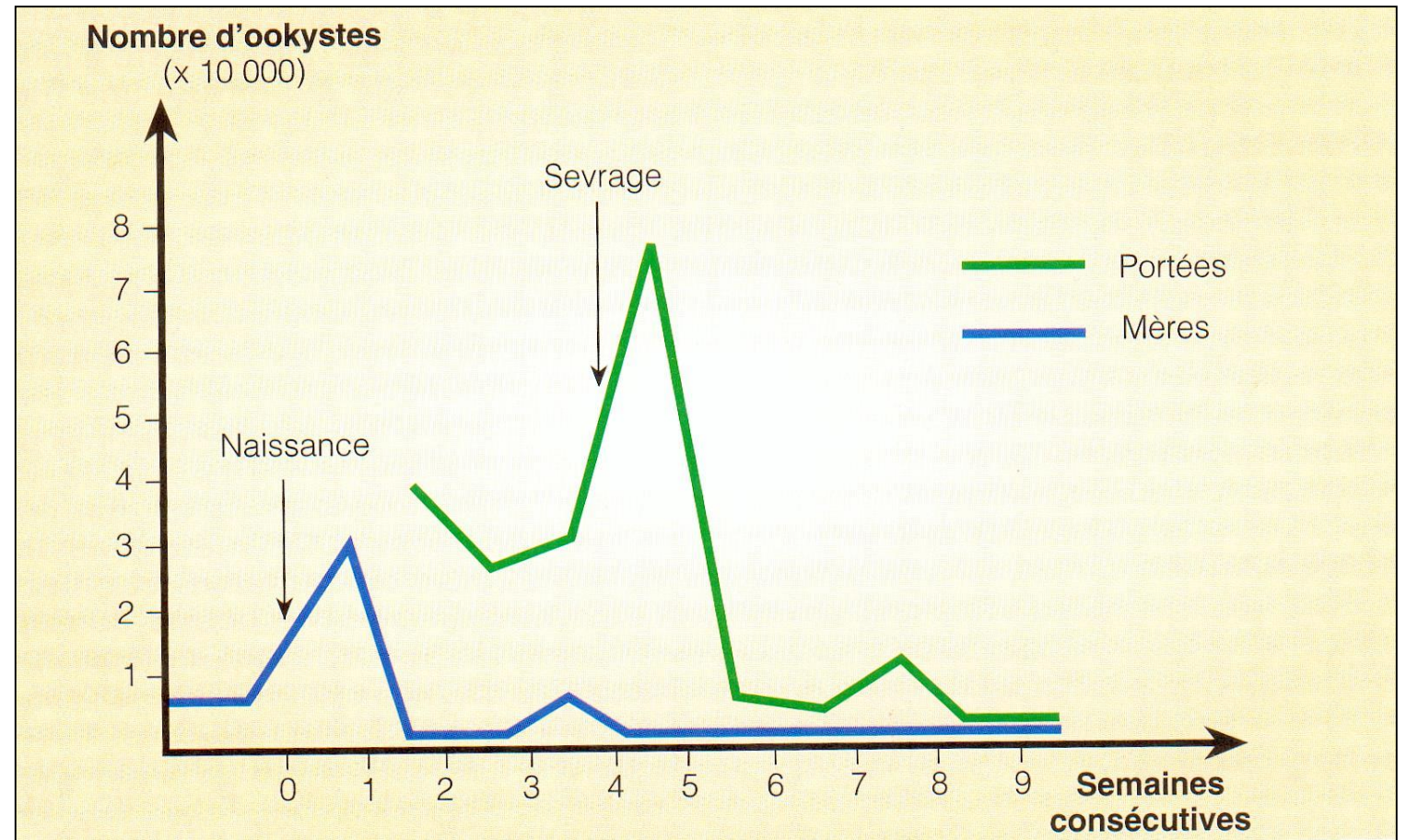


PARASITE CYCLE



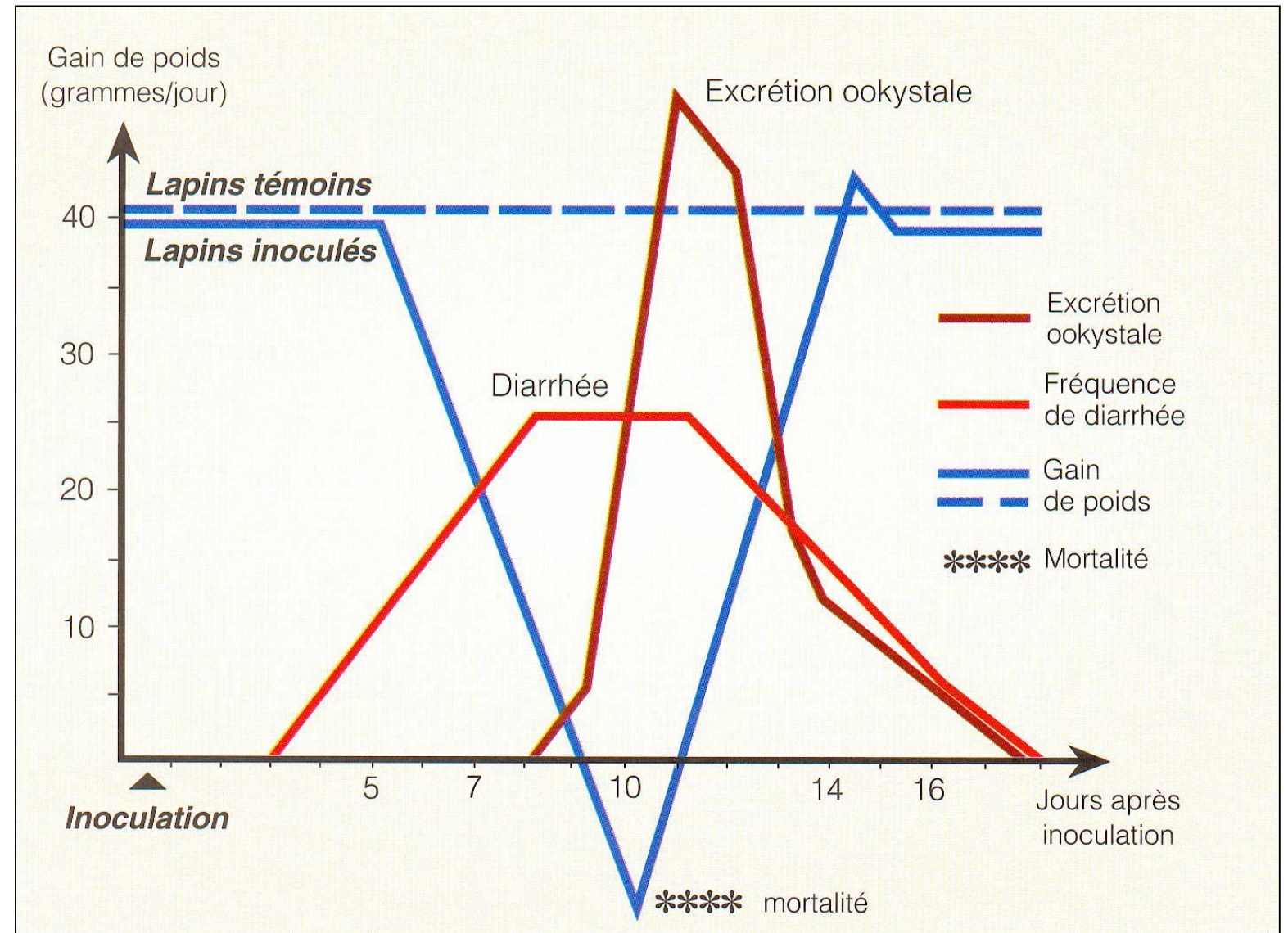
Evolution of coccidiosis

- ▶ Contamination occurs **via the mother** (young in the nest) or on the **cages** (growing rabbits)
- ▶ **Multiplication** takes place and then excretion together with clinical expression
- ▶ This is the better period when the droppings are taken for analysis (35/55 days if the contamination is in the nest)



Evolution of coccidiosis

- After a **silent incubation** phase, **diarrhea** sets in and then **mortality** and **oocyst excretion** becomes strong
- A few days later, the survivors **gained immunity**

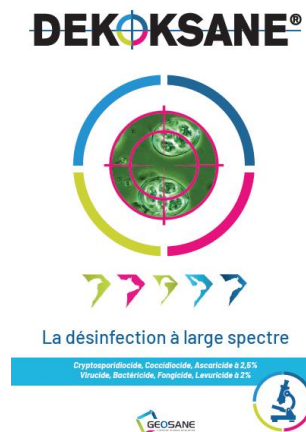


DIAGNOSIS OF INTESTINAL COCCIDIOSIS

- ▶ Clinical elements (diarrhea, drops in ADG, mortality) should be sought
- ▶ We will also take into account
 - ▶ Water and food consumption
 - ▶ Contagious aspect or not,
 - ▶ Age of affected animals,
- ▶ A **count of the oocysts** is carried out and according to the threshold obtained their **identification** in order to know whether the disorders observed are related to the coccidia present.
- ▶ Beyond 5000 oocysts per gram of intestinal contents or 300 oocysts / g of droppings (threshold considered pathogenic), coccidia are identified
 - ▶ If very pathogenic species are found, treatment is essential.
 - ▶ If these are coccidia with little or no pathogens, we will look elsewhere for the cause of the disorders observed.
- ▶ If the diarrhea cannot be linked to coccidiosis, other causes for diarrhea are considered (food, bacterial with *E coli*, *Clostridium*, parasitic with *Giardia*, etc.)

PREVENTION / BIOSAFETY

- ▶ Care should be taken to keep the rate of coccidia as low as possible in the farm.
 - ▶ Burn the litter of the nests if necessary,
 - ▶ Use of active detergent on oocysts
 - ▶ Clean the cages and the bottom grids with a high pressure steam jet if possible in hot water (120 ° C),
 - ▶ Burn the bottom of cages (difficult to do because effective if very high temperature),
 - ▶ Avoid any stress by insisting on the repetition of gestures at fixed times.
- ▶ Fattening kits that shed coccidia usually ingested them in their mother's cage. It will therefore be useful, in the event of declared coccidiosis, to treat both the young rabbits and their mothers.



- ▶ As a preventive measure, it is possible to add a coccidiostat (which will prevent the multiplication of coccidia) in the food.
 - ▶ **Robenidine** additive at 66 ppm : Withdrawal period 6 d
 - ▶ It inhibits the development of first generation schizonts, preventing the early stages of the cycle from unfolding.
 - ▶ The excretion of oocysts is therefore reduced and the risks of contamination are reduced.
 - ▶ Sometimes resistance: *E. media*, *magna* for example
 - ▶ **Salinomycin** additive à 20 ppm (growing rabbits only) : Withdrawal period 5 d – Cardiotoxicity - not available on the market
 - ▶ **Dicalzuril** 1 ppm : Withdrawal period 1d : coccidiocidal effect on the sexual or asexual stages of the development cycle. Limited effect on intestinal lesions due to endogenous parasitic stages of more than 16 days. Treatment with diclazuril interrupts the coccidian cycle and the shedding of oocysts for about 2 weeks,
 - ▶ **Decoquinate** (antiprotozoal drug) is used between 70 and 100 ppm. is used between 70 and 100 ppm 28 d

TREATEMENT (France)

- ▶ If there is a count greater than 5,000 oocysts per gram and the coccidia are moderately pathogenic, and there are also clinical symptoms (diarrhea, reduced ADG, mortality), it should be treated
 - ▶ The usual treatment for coccidiosis is the administration of **sulfonamides**.
 - ▶ **Sulfadimethoxine** is the most active and least toxic of all in rabbits.
 - ▶ The Withdrawal period is set at **21 days** due to the presence of residues beyond 15 days after administration (voluntary approach)
 - ▶ at 50 mg / kg BW in drinking water for five days
 - ▶ **Toltrazuril** can be used at a dose of 7 mg / kg BW for two days, but the withdrawal time in rabbits is 35 days (Bayer study)
 - ▶ **Phytotherapeutic products** like **Emerifit** give excellent results while not being antibiotics.
 - ▶ 2 ml / liter of water for 5 days as a treatment on mothers and young before weaning (between 28 and 33 days)
- ▶ Protocol :
 - ▶ Between **28 and 33 days** of age (before weaning) on mothers and offspring.
 - ▶ To renew 3 bands in a row
 - ▶ At the same time, distribute a **coccidiostat in the feed** at the start of the growth phase after weaning (be careful to accumulation with Diclazuril and Toltrazuril)



Example of classical treatment of coccidiosis

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04 of November 2021 16h30/17h30

TREATMENT PROTOCOL

- ▶ Open study on 6 fattening houses bringing together a total of 16 to 30,000 rabbits depending on the herd (**average 26,000**).
- ▶ Females bred in a single room in a single group of **42 days**.
 - ▶ Farm monitoring is carried out by collecting droppings before and after treatment, droppings on which *Eimeria* **counts and identifications** are made.
 - ▶ **Weighings** of the rabbits are intended to judge the ADGs.
 - ▶ The incidence of **diarrhea** is observed.
 - ▶ **Mortality** rates are recorded.
- ▶ The rabbits are bred in collective wire cages, first with their mothers for 33/35 days and then with their collaterals, by 8, after weaning.
- ▶ They are weaned in a **clean and disinfected** building.
- ▶ **Food is limited** and drinking **water** is dispensed *ad libitum*.

TREATMENT PROTOCOL

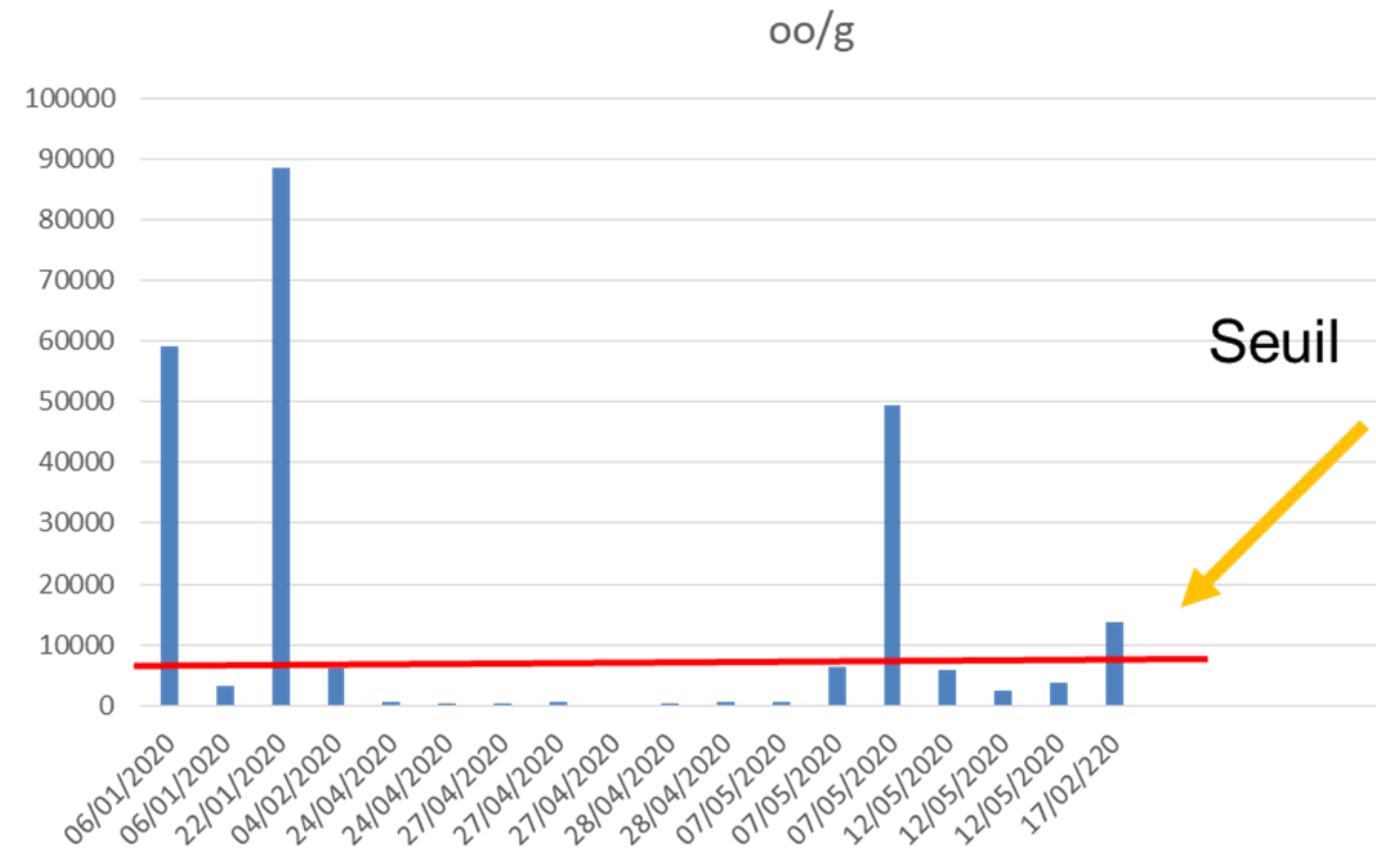
- ▶ The establishment of treatment with **toltrazuril at 7mg / Kg BW / d for 2 days** (Cevazuril® 25mg / ml Gallus oral solution at 0.28 ml / Kg BW / d for 2 days) before weaning at 32 days.
- ▶ Cleaning the cage bottoms and feeders with a high pressure hot water device followed by disinfection with 2.5% Dekoksane (25 ml / liter) applied to the surfaces at a rate of 0.4 liter / m² recording
- ▶ Weighs once a week and daily mortality record
- ▶ The excretion of oocysts in droppings is measured for each batch before treatment and 48 hours after treatment.
 - ▶ An identification of oocysts is made for a significant threshold
 - ▶ 300 oocysts per gram of dropping sand for 5,000 oocysts per gram of intestinal contents (during necropsy).



	Conduct of the test
birth + 32 days	<ul style="list-style-type: none">- Faeces analysis- Cevazuril treatment
birth + 35 days	<ul style="list-style-type: none">- Weaning in a clean room disinfected with Dekoksane- Faeces analysis
birth+ 70 days	<ul style="list-style-type: none">- Final analysis of masses- Final Mortality Analysis

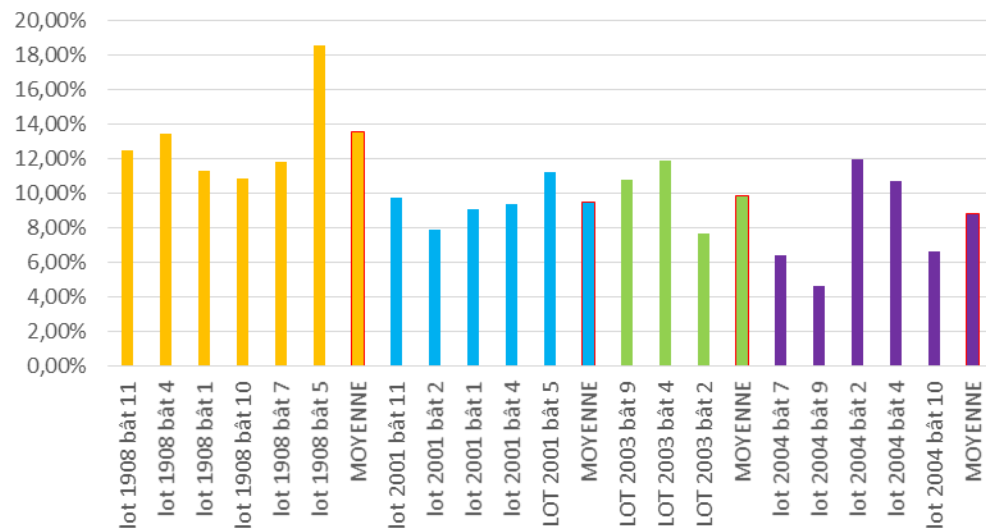
PRESENCE OF COCCIDIA

- ▶ We start from an infestation around **59,000 oo / g**
- ▶ After the first treatment, there are lots still infested or which re-infest
- ▶ Little by little it **decreases**
- ▶ You have to be very vigilant because the parasite is still there
- ▶ **Controls** are needed

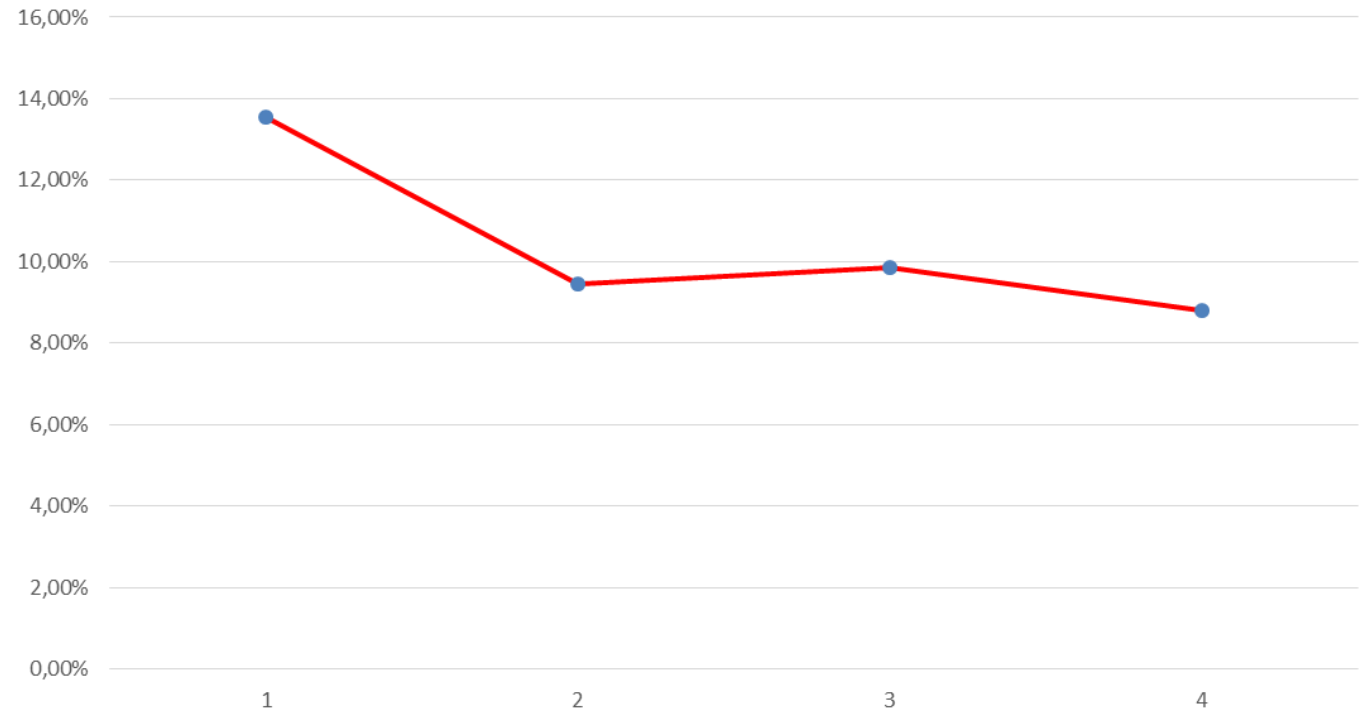


MORTALITY RESULTS

% mortalité sur 4 bandes



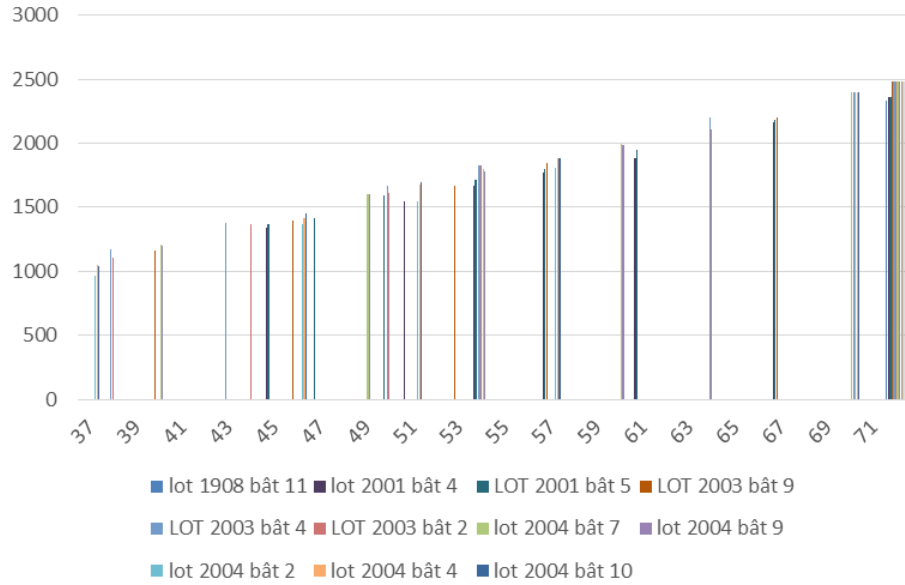
pourcentage moyen mortalité bande 1 à 4



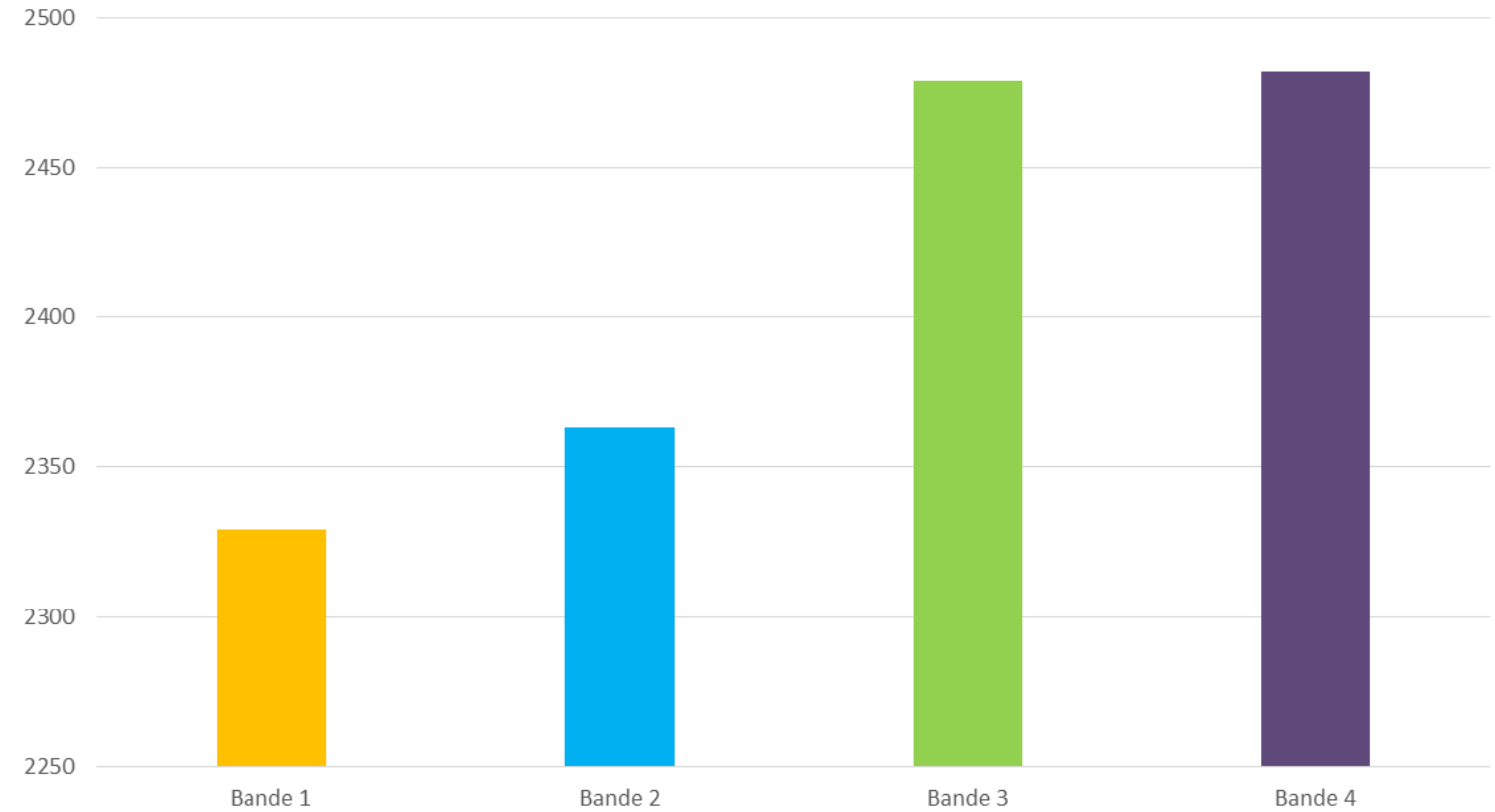
	Band 1	Band 2	Band 3	Band 4
% mortality	13,55%	9,47%	9,84%	8,80%

GROWTH RESULTS

Masse (g) / âge



Masse (g) à la vente 70j



At 70j	Band 1	Band 2	Band 3	Band 4
Weight (g)	2329	2363	2479	2482

- ▶ Mortality between band 1 and 4:
 - ▶ Last band gain 4.75% more viability
 - ▶ Or out of 26,000 rabbits 1235 rabbits sold in addition at 2.482 Kg = 3065.27 Kg
 - ▶ With an average price (2020 average price of € 1.88) = **€ 5,763 / band**

Gain band 1/2	Gain band 2/3	Gain band 3/4
+ 4,08%	+ 3,71%	+ 4,75%
4950 €	4501 €	5763 €

- ▶ Sales weight difference between band 1 and 4:
 - ▶ Gain on the last strip of 153 g / rabbit / bande
 - ▶ That is to say on 26000 rabbits 3978 Kg
 - ▶ With an average price (2020 average price of € 1.88) = **€ 7,479 / band**

Gain band 1/2	Gain band 2/3	Gain band 3/4
+ 0,034 Kg	+ 0,150 Kg	+ 0,153Kg
1662 €	7332 €	7479 €

CHARGES

- ▶ Cost of treatment
 - ▶ Cevazuril 25mg / Kg to 0.28 ml / Kg PV / d over 2 days at weaning
 - ▶ 26,000 rabbits weighing 0.9 kg over 2 days: 13.1 liters of treatment on growing rabbits + 6.7 liters for mothers.
 - ▶ Or an investment of € 1,490 (€ 986 for growing rabbits)
- ▶ Disinfection: 138 € / band (to be done anyway)
- ▶ Addition of feed for non-dead rabbits (4Kg per rabbit at approximately € 0.28 /

	Cost band 1/2	Cost band 2/3	Cost band 3/4
Desinfection	- 138 €	- 138 €	- 138 €
Treatment does and kits	- 1490 €	- 1490 €	- 1490 €
Add feed	- 1188 €	- 1080 €	- 1383 €
TOTAL	2816 €	2708 €	3011 €

EARNINGS

- ▶ Estimated gain on last band:
 - ▶ Lower mortality: € 5,763
 - ▶ Extra weight: 7479 €
 - ▶ Surprise: 4cts more per kg as a reward for performance
 - ▶ TOTAL: € 12,950 i.e. € 0.50 per rabbit or € 0.20 / Kg

	Gain band 1/2	Gain band 2/3	Gain band 3/4
Mortality	+ 4950 €	+ 4501 €	+ 5763 €
Weight	+ 1662 €	+ 7332 €	+ 7479 €
Charges	- 2678 €	- 2570 €	- 2873 €
SUB- TOTAL	3934 €	9263 €	10369 €
yield	+ 2422 €	+ 2458 €	+ 2581 €
TOTAL	6356 €	11721 €	12950 €

ROUND TABLE: ALTERNATIVES

- ▶ In France, many products based on **essential oils** are available in drinking water or through food
- ▶ It is necessary to validate the **stability** of the product and to test the **effectiveness** of the product
- ▶ In **your** respective **countries**, **what are the alternatives?**





**thank you for your
attention**

