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# PATHOLOGICAL ASPECTS OF MEAT RABBIT FLOOR-PEN BREEDING

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The deep lack of balance of intestinal flora is often said to be the cause of rabbit enteritis, especially of the post-weaning kind, besides being also due to pre-existing microbic infections like enteritis viruses, intestinal coccidiosis etc. (Loeliger, 1980, Peeters et al., 1984), but it seems now to be due also to dietary factors as the crude fiber content (Sinkovics 1980), and/or to breeding mistakes (Colin and Renault, 1980). Such premises gave origin to the straw litter floor-pen breeding and weaning in opposition to the lack of space and fiber of meat rabbit breeding in cages.

## Material and Methods

1) Rabbits and breeding buildings.
32 day old hybrid Hyla rabbits coming from an intensive breeding were chosen for our floor-pen breeding trial. During previous controls in the above-mentioned breeding there had been noticed coccidiosis sub-clinic forms present also in wire hutches reared animals notwithstanding the usual anti-coccidiosis chemioprophylaxis. At first a part of the rabbit bound to be litter bred was hosted in a naturally lit and ventilated tunnel shed

properly insulated but not heated, at about 50 Km. from Milan. The second part bound to be cage bred was hosted in a rabbitry of the Facoltà di Medicina veterinaria of Milan. Such place was insulated and had a 16hour/a day light programmation. The hutches, all-metal welded wire floor commercial type, had an automatic water system and feeder for a free alimentation. Both the rabbitry and the cages and the shed had previously been washed up and disinfected.

2) Division into groups

In the shed prepared for the floor-pen breeding 456 rabbits at random were hosted and subdivided into 6 mingled groups, females and males in the same proportion, of 76 rabbits each. Each group was given a 6,6 sqm place- 11,5 subject/mq- with oats straw spread in the proportion of 20kg per group, a 2m automatic water system and 2 feeders- 16kg capacity- as normally used for chicken. The first part of the lasted 4wks, from 5th to 9th week of age. Rabbits were fed ad libitum with a commercial pelleted ration, such as follows:

| | |
|---|---|
| crude proteins | 19,8% |
| fat | 3% |
| fiber | 13,4% |
| ash or mineral | 9,6% |
| nitrogen-free extracts | 54,6% |

additioned with Robenidine (R)100ppm and 300ppm mixture of metichlorpindol and methylbenzoquate, 100:8,35 proportion respectively(L). Out of the six groups, three (N°4,6, 8 of the fig. 1) were fed with R anticoccidial drug, while the others (N° 3,5,7 of the fig. 1), alternated in position, with anticoccidial L. The two groups set in the rabbitry in Milan and composed of 59 rabbits each were fed with L or R, as the ground pen groups and were marked number 1 and 2. Before being definitely settled each of the 574 rabbits was weighed and treated topically with sulphur and salicidic acid, owing to a cutaneous mycosis. During the second part of our test, from 10th to 13th week of age, anticoccidial somministration was suspended, and the floor-pen groups were moved to cages, more precisely 4 groups of 59

rabbits each were moved to the Milan rabbitry and two other groups of 59 rabbits each were settled in cages set in the same shed. All this was to evaluate the probability of the negative influence of transport and housing system change. During the whole test every rabbit was weighed each week at the same time, the feces of every group were gathered weekly to count the fecal occysts by the Mc Master technique. The feed consumption was calculated at the end of every period.

3) Last part of the trial.
After 5o days from the beginning of the test all the rabbits were slaughtered. The post-mortem inspection was particularly accurated, taking especially into consideration the eventual coccidial lesions, both in the liver and in the gastro-intestinal tract.

4) Sanitary control
All the rabbits underwent a rigorous daily control of their sanitary conditions, particularly aimed to evidence respiratory or enteric symptoms which are very common in rabbit breeding. Just at the arrival the control of feces showed the presence of intestinal flagellates, probably of Chilomastix cuniculi in some subjects, therefore they were medicated for 7 days with water containing an imidazole derivative. During the second part of the test, at its 4th week, they underwent an antibiotic therapy (chlortetracycline) since respiratory symptoms owed to Pasteurella multocida were getting worse, but such treating gave no sensible result.

## Results

Figure 2 shows the fecal oocysts emission course (N°/g feces) taken weekly both for the floor-pen and cage bred groups and distinguished for the different anticoccidial treatment.
As we had foreseen the cage bred groups showed a very low parasitic level all along the treating period (4 weeks) and after. Also the litter bred rabbits showed a low fecal oocysts emission, as a demonstration of the drugs efficacy. The highest

emission peak was on the contrary reached in the last period of our test, soon after the previously litter bred rabbits transport and only in the L treated group. We must however say that such values were always normal; as for this parameter only the difference between the rearing periods (cages versus litter) and not between the differently treated groups was statistically significant.

As for mortality we must first say that we never recorded cases of coccidiosis, as also shown by the low fecal oocyst levels. Losses percentage was normal, such as the one in intensive breedings and referable to common bacteria diseases, more or less conditioned by environmental and/or managing factors. In particular I was able to notice also, during the test, that independently of the breeding and treatments kinds, immediately soon after weaning there were cases of iperacute/ acute dysentery that caused the death of affected rabbits. An accurate control of the litter bred groups allowed us to evidence that the diarrhoea receded while it never happened with wire cage bred rabbits.

Most frequently death for acute and iperacute typhlitis was caused by the E.coli pathogenic agent.

P.multocida, alone or with B.bronchiseptica, Staphylococci and also Enterobacteriaceae were responsible of the respiratory apparatus affections of varying importance, from simple nasal discharge in rabbit with snuffles to thoracic empyema, that were shown during the central or final period of the test (table 2). As results from fig. 3, my trial showed no sensible difference, as for mortality, between the litter bred rabbits and the cage bred ones, not even after their removal or transferring into cages at the end of the 4 weeks'litter period.

As regards the zootecnic parameters about weight increase and conversion indexes, tab. 1 shows how the groups behaving was always influenced by their housing system.

During the first period of both the proofs the litter bred rabbits kept a medium daily gain generally higher than the

cage bred ones. Always in the same period also the feed conversion index is generally better, while in the second part of the test the situation is completely upset showing a remarkable loss, especially as for the conversion ratio of the rabbits moved again into cages , thus putting in evidence the negative effect of narrow space constriction on rabbits accustomed to floor-pen. Similar considerations can be made with respect to the daily gain course that follows the conversion index variations (tab. 1).
No coccidial lesions was shown either during the litter period or during the drugs somministration suspension and when the rabbits were moved to cages for the usual finishing. Anyway the absolute value, differently from what reported in literature (Davies et al., 1963; Löliger, 1969; Licois and Coudert, 1980) of the given oocysts remained very low and not significant. Taking into consideration the damn that coccidiosis have always caused in rabbits traditionally litter bred, such results seem to be noticeable and deserves, in spite of further and necessary confirmations, to be considered another step towards rabbit alternative breeding.

## Conclusions

As regards the test of permanent litter breeding, though much must still be done, we may say that:
1) sumministrating an efficacious antiprotozoal drug, floor-pen rabbit breeding can be practised without fearing the serious losses caused by coccidiosis that have forced the use of wire cages;
2) the anticoccidial R and L dosage we used has proved perfectly able to check the natural coccidiosis. Such dosages, studied on the basis of experimental infections, were well tolerated by the animals but result to be higher than the limits allowed or required by the present EEC legislation on their use

for rabbits. Further tests should be made to check the efficacy, at allowed dosages, on permanent litter bred rabbits; 3) floor-pen breeding proved to be favourable both for weight gain and for conversion ratio respect to cage breeding. A following stabling change cancels initial benefits. Since it is not possible to keep rabbits in small floor-pens beyond 9th week of life, owing to the peculiar aggressiveness of these animals, it might be advisable to study new diets for meat rabbits to be able to have them slaughtered already during that period. Otherwise, as in Spain or elsewhere, we might stimulate also in Italy the consumption of meat of rabbits of less than 2 kg weight.

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| Days after weaning: 0 - 28 | Average daily gain (g) | Feed conversion ratio |
|---|---|---|
| Litter (groups 3-8) | 31.6 | 2.6 |
| Cage (groups 1-2) | 24.5 | 3.9 |
| **Days after weaning: 29 - 49** | | |
| Litter/cage (groups 5-6, same building) | 22.6 | 6.4 |
| Litter/cage (groups 3-4-7-8, change of rabbitry) | 27.1 | 4.4 |
| Cage (groups 1-2) | 36.1 | 3.3 |

Table 1 - Breeding results of rabbits reared in different housing systems.

| Days after weaning | Floor-pen groups (456 rabbits) | Wire cages groups (118 rabbits) |
|---|---|---|
| 0 - 7 | E°°°°° | E°° |
| | P°° | P - |
| | M° | M - |
| 8 - 14 | E°°°°°°°°°° | E°°°°° |
| | P° | P° |
| | M° | M° |
| 15 - 21 | E°°°°°°°° | E°°° |
| | P - | P - |
| | M - | M - |
| 22 - 28 | E°°°°°°°°°° | E°°° |
| | P°° | P° |
| | M° | M - |
| 29 -35 | E - | E - |
| | P°°°°° | P°° |
| | M°° | M - |
| 36 - 42 | E° | E° |
| | P°°° | P - |
| | M - | M - |
| 43 - 49 | E - | E - |
| | P°°° | P° |
| | M - | M - |

Table 2 - Causes of death of rabbits reared in different housing systems.
E: enteritis, P: pneumonia, M: miscellaneous diseases.
°: N° of dead rabbits.

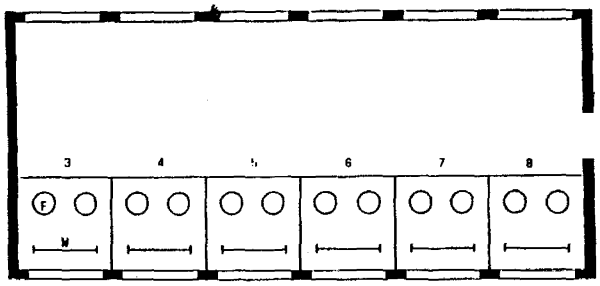


Fig. 1 - Disposition of floor-pen groups. W: 2 m automatic water system
F: feeder. Numbers 3-5-7: L as anticoccidial drug.
Numbers 4-6-8: R as anticoccidial drug.

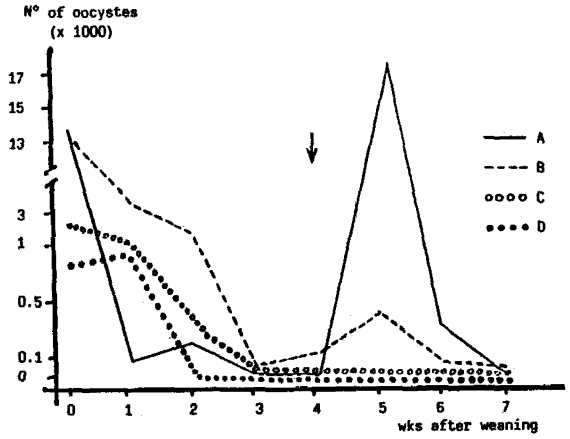


Fig. 2 - Weekly counts of fecal oocysts. A: floor-pen L groups, B: Floor-pen R groups, C: cage L group,, D: cage R group. The arrow indicates the time of removal to

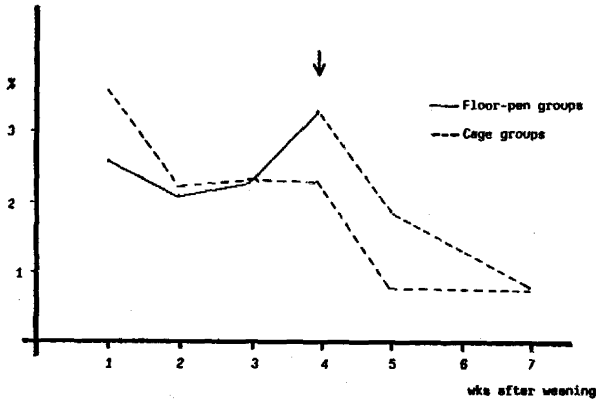


Fig. 3 - Weekly mortality. The arrow indicates the time of removal to cages of floor-pen groups.

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SUMMARY
A floor-pen trial was carried out to study the possibility of rearing rabbits between the 5th and 9th week of age on straw litter. At weaning 574 hybrid rabbits were divided into 8 groups: 2 groups (controls) in different density cages, 6 groups on litter (11.5 subjects/sqm). In 4 groups 100 ppm of Robenidine and in other 4 groups an association of 300 ppm Metichlorpindol+Methybenzoquate (100 : 8.35) were continuosly present in the feed and both controlled the coccidiosis very well. The average daily gain and feed conversion ratio were better in floor-pen groups till 2 months age; no difference in mortality. In conclusion my preliminary data showed that: 1- meat rabbit floor-pen breeding is advantageous till to 2 months of age, with the indispensable anti-

# ASPETTI SANITARI DELL'ALLEVAMENTO DEL CONIGLIO SU LETTIERA PERMANENTE

RIASSUNTO
Al fine di verificare la possibilità dell'allevamento del coniglio da carne su lettiera permanente dalla 5ª alla 9ª settimana di età, 574 soggetti ibridi da carne appena svezzati sono stati divisi in 8 gruppi randomizzati: 6 di questi sono stati allevati su lettiera di paglia di avena e gli altri 2, per confronto, sono stati alloggiati in gabbie tradizionali. La densità iniziale dei conigli su lettiera risultava di 11,5 soggetti/mq. Metà degli animali sono stati alimentati con mangime contenente 100 ppm di Robenidina (R), la altra metà è stata trattata con 300 ppm di Metilclorpindolo+Metilbenzoquato nel rapporto di 100 : 8,35 (L). Dalla 10ª settimana alla macellazione (12ª settimana) gli anticoccidici sono stati sospesi e gli animali trasferiti tutti in gabbia per evitare lotte intraspecifiche.
I risultati ottenuti (mortalità senza differenze significative, miglioramento degli IMG e ICA nei conigli "a terra" rispetto a quelli in gabbia) indicano che l'allevamento del coniglio su lettiera permanente dalla 5ª alla 9ª settimana di età è possibile a patto che vengano adeguatamente controllate le infezioni protozoarie, come verificatosi con le dosi di R ed L qui usate.