
**ABSTRACTS OF THE XXXIII SYMPOSIUM OF ASESCU
CALAHORRA, SPAIN, OCTOBER 30 - 31, 2008.**

The annual Congress of the Spanish Association of Cuniculture (ASESCU) was held in Calahorra (La Rioja) on 30-31st October of 2008. The 33rd edition was devoted to study different strategies to enhance the farm profitability. The high increment in the feeding and the low price of the meat have been the main responsible of the decrease in the profitability in the last 2 years. Different possibilities to reduce the feed conversion ratio (FCR) both in fatteners and females were discussed in two sessions. Furthermore, a total of 15 communications were presented in 5 working sessions: Meat quality in commercial or wild rabbits, Genetic and Reproduction, with a focus on new selection criteria and semen quality, Management and economy, with a study of the costs, Nutrition, with strategies to reduce mortality and Pathology, with references to different pathologies.

A MORE EFFICIENT RABBIT FARMING**STRATEGIES TO IMPROVE FEED EFFICIENCY**

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Different possibilities to reduce the feed conversion ratio (FCR) both in fatteners and females are discussed. The dietary factor having the largest impact on the FCR in fatteners is the energy concentration. Within practical margins, an increase with 0.5 MJ DE/kg leads to a decrease of the FCR with 0.15-0.20 points. The fibrous rabbit diets can be made more energy dense by using fat or oil rich feedstuffs. In a phase feeding schedule, a significant decrease of the FCR can herewith be obtained in the finishing period. However, to maintain the pellet durability, fat addition is limited to 2-3%. Once fatteners have a weight of 2.0 kg, their FCR exceeds 3.25. The use of a quickly growing sire line (high correlation with FCR) leads to a reduction of the FCR of over 10% during the fattening stage. In females, the number of weaned young is the most determining factor. An increase with 5 young/o/year decreases the FCR in the maternity with 11%. When simultaneously the post-weaning mortality decrease with 5%, the positive impact on the FCR is even 18%. Losses in the fattening stage, especially in the finishing period have a large impact; e.g. a decrease from 10 till 5% reduces the FCR in the fattening unit with 6.6%. Also a correct restriction of fatteners or non lactating does is helpful to reduce the farm FCR. High stocking

density or large group sizes leads to a less favourable FCR. Finally feeding wastage due the feeder design or meal losses can have a significant impact on the FCR. Optimization of the different factors involved in the FCR leads to a farm FCR around 3.0.

FEED RESTRICTION IN RABBIT PRODUCTION

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The interest of feed restriction during the growing period of rabbit led several authors to realise different trials in order to study the feeding behaviour of rabbit. Compared to other mammals, rabbit is peculiar specie because feed restriction in collective cages is favourable for feed efficiency, homogeneity of performances, and digestive health without affecting too much carcass qualities. There are used three methods to do the feed restriction: limited access to feed or water and a quantitative feed restriction. This last one is the most applied in production farms. Nevertheless a good knowledge of the evolution of growth and feed consumption is necessary to set up an automatic distribution of feed with the current equipment.

MEAT QUALITY AND BODY COMPOSITION

EFFECT OF FASTING TIME ON THE DRESSING PERCENTAGE AND THE MICROBIOLOGICAL QUALITY OF RABBIT CARCASS

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The aim of this work was to evaluate the effect of different fasting periods on carcass yield and microbiological quality of rabbit carcass. Seventy two New Zealand White x Californian rabbits were fed with the same commercial feed (35% NDF, 13% starch, 7.4% soluble fibre) during the whole fattening period. The feed was removed to one third of the rabbits 24 hours before the slaughtering, 12 hours before the slaughtering to another third of the animals and the remaining animals were fed ad libitum since their transport to the slaughterhouse. There were no significative differences in live weight or carcass weight of the rabbits. Carcass yield was higher for animals fasted 12 and 24 hours before the slaughtering (3 and 5 points more respectively) than animals were fed ad libitum since their transport to the slaughterhouse. There were significative differences when pH and temperature of the carcasses were compared after the cold time and 24 hours post mortem. The log cfu/g of Enterobacteriaceae and Coliform were higher for animals fed ad libitum. A gradual increase with the time was observed in the microorganism content of the carcass. The highest values were reached 11 days after slaughter. There were no differences between treatments for the microorganisms analysed in the caecum content. In conclusion, in animals fasted 12 or 24 hours before the slaughtering, decreases the gastrointestinal weight, the carcass yield is increased without impairment of carcass quality parameters as temperature and pH, and enhances the carcass microbiological quality.

EFFECT OF THE USE OF DIETS DIFFERING ON DIGESTIBLE FIBER AND STARCH CONTENT ON THE COMPOSITION OF THE CARCASS AND THE MEAT QUALITY OF RABBITS

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Ninety young rabbits were distributed in three groups: group AA, fed with a high digestible fibre (hemicelluloses and pectins)/low starch non-medicated diet (diet A) from 17 to 63 days old (slaughter age); group AB fed with diet A from 17 to 42 days old and with a low digestible fibre/high starch non-medicated diet (diet B) from 43 to 63 days and group CC fed with a medicated commercial diet (100 ppm zn-bacitracine; diet C) from 17 to 63 days old. Live weight, chilled and reference carcass weight, dressing out percentage and meat to bone ratio were lower in group AA than in group CC (2273 vs. 2361 g, 1255 vs. 1339 g, 1008 vs. 1063 g and 55.2 vs. 56.7%, 5.72 vs. 5.95, respectively). Replacing with diet B at the end of the fattening period (group AB) led to no differences with group CC in these variables except for meat to bone ratio. The three groups differed in dissectible fat percentage AA: 2.62%, CC: 3.36% and AB: 3.91%). At 24 h post-mortem, pH, lightness and redness of the carcass and lightness, redness and yellowness of the meat in m. Longissimus did not differ between groups, but group AB had the smallest value of yellowness of the carcass and group CC the highest (0.50 vs. 1.56). Fat percentage in the hind leg meat was larger in groups AB and CC than in group AA (4.99, 4.71 and 3.75%, respectively). Therefore feeding with high digestible fibre and low starch diets during the fattening period impairs growth and some carcass characteristics, but these effects disappear when replacing with low digestible fibre and high starch diets during the end of the fattening period

CHARACTERISATION OF WILD RABBIT CARCASS MARKETED

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With the aim to characterise the commercial presentation of the wild rabbit (*Oryctolagus cuniculus algirus*) obtained from hunting, 53 specimens (unskinned, eviscerated rabbits) bought in traditional markets of Seville (Spain) were analysed. The specimens weighed 768 g and had a total length of 408 mm. The carcasses, obtained by flaying the specimens, weighed 652 g and amounted 85% of the specimens weight. The skin amounted 11.3% of the specimen weight. In general terms, biometric measures and the measures related obtaining the carcass matched well with that published in the literature for the wild rabbits of the same subspecies, but differed from the ones of the meat rabbits and wild rabbit of the *O. c. cuniculus* subspecies. There was no sexual dimorphism in biometric measures or those resulting from obtaining the carcass, except for the total length, that was higher in females.

GENETICS AND REPRODUCTION

DIVERGENT SELECTION FOR ENVIRONMENTAL VARIABILITY OF THE RABBIT LITTER SIZE. FIRST RESULTS

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A divergent selection experiment on phenotypic variance of litter size was carried out in rabbits. Selection was based on phenotypic variance of litter size for each doe after correcting litter size for the fixed effects of year-season and lactation status (PVC). Selection pressure on does was approximately 30% in each line. Males were chosen within sire families in order to avoid the increase of inbreeding. The total number of records for litter size and PVC were 1929 and 534, respectively. Results of the first generation of selection were analyzed using Bayesian methods. The High line showed a higher PVC than the Low line in the first generation of selection. The difference between lines (D) was 0.73 ($P(D>0) = 96\%$). This difference in PVC was associated with an increase in the phenotypic variance of litter size ($D = 1.49$, $P(D>0) = 100\%$) and a decrease in litter size in the High line ($D = -0.38$ kits, $P(D>0) = 93\%$). The first preliminary results of this study suggest that the variance of litter size seems to be under genetic control.

EVALUATION OF A MATERNAL LINE SELECTED FOR PRODUCTIVE LONGEVITY

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The aim of this study is to carry out a first evaluation of a new line founded following criteria of hyper-longevity. This new line has been created following a backcrossing schema in which genes from extremely long-lived females in commercial farms were accumulated. Results shown that the new line (LP) has a superior longevity than the V line, in addition line LP does not have a poorer prolificacy than V line. This results have to be considered as the first evidence of this new line evaluation a more evidences supporting this line have to be recorded, in particular those related with the performance of crossbred involving this new line.

EFFECT OF THE ENVIRONMENT AND PERFORMANCE TRAITS ON THE QUALITY OF SEMEN IN RABBITS SELECTED BY GROWTH RATE

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The aim of the present work was to evaluate the relationship between the average daily gain (ADG) during the fattening period of males selected for growth rate and the future semen production and quality. A total of 21634 ejaculates from 336 males from the R line (selected for growth rate between 28 and 63 days of live) were used. Semen volume, sperm concentration, motility, aspect and aptitude were controlled. The principal component analyse showed that the main factors explaining data variability were the semen quality and the ADG of the animals. In fact, cluster analyse showed the presence of 2 clusters differing mainly on seminal characteristics, showing the cluster 1 a greater volume (+0.63 mL), sperm motility (+78%) and concentration, as a higher percentage of suitable sperms (+94%) than those included in the cluster 2. The ADG during the fattening period was not correlated with the semen production (volume and concentration) or sperm motility. Although the correlation was very low (-0.05 to -0.08), significant negative correlations between the average daily external T^a at the extraction day with the volume and motility of semen ($P<0.0001$) were observed. In conclusion, for the particular population of a nucleus of males selected for ADG and allocated for artificial insemination, the ADG doesn't seem to go against their future semen production and quality.

MANAGEMENT AND ECONOMY

PRODUCTIVE RESULTS AND COSTS VALUATION OF EXTENSIVE MANagements

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The aim of this work was to study two reproductive extensive managements, long term applied in an industrial rabbit farm. Rabbit does were distributed in two experimental groups: does inseminated on day 18 pp (EXT18) and weaned at 40 days of lactation and does inseminated on day 25 pp (EXT25) and weaned at 47 days. A total of 33.499 artificial inseminations (AI) were analysed using fresh semen. Fertility and fecundity were similar, although rabbit does of EXT25 group tend to be more fertile in all seasons, except in summer.

Kits born alive per AI were also similar, but in spring, a lower number of kits born alive per parturition were obtained in EXT25. Just as we expected, productivity of EXT18 group was higher, with 0.5 more kits sold per parturition, being lower to the difference between the theoretical and real parturition interval obtained. Analysing our results, from a practical point of view, we could affirm that the reproductive system EXT25 can be viable. This system is not detrimental to fertility and allows only one fattening band, so it could counteract the lower productivity, increasing the number of does.

“EXTREME SITUATION OF THE ECONOMICAL VIABILITY”

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The increase of feed prices and decrease of meat price received by the rabbit producers have led to a decrease in the profitability of the rabbit farms. The production costs in 2008 of a model rabbitry of 600 maternal cages and 112.7 kg of liveweight produced per breeding cage are reported, obtaining the data from different rabbit organizations added to the Spanish interprofessional INTERCUN. Evolution of rabbit meat price received by the producers in Spain during 2007 and 2008 and possible criteria to improve the profitability by the rabbit farmer are also analyzed. Fix costs considered were labor (0.21 euros/kg liveweight produced, 34.6% of fix costs), recoveries (0.15, 24.7%), financial costs (0.09, 14.8%), social security (0.05, 7.9%), supplies (0.03, 5.4%), repairs and maintenance (0.02, 3.2%), external works (0.02, 2.7%), insurances (0.01, 1.7%), taxes (0.01, 1.0%) and other costs (0.02, 3.9%), being the fix costs 0.60 euros/kg liveweight produced (29.2% of total costs). Variable costs considered were feed (1.24 euros/ kg liveweight produced, 85.2% of variable costs), medications (0.08, 5.4%), artificial insemination (0.07, 4.5%), and rabbits replacement and others (0.07, 4.8%), being the variable costs 1.45 euros/kg liveweight produced (70.8% of total costs). The total costs in 2008 were 2.05 euros / kg liveweight produced.

NUTRITION

EFFECT OF THE DIETARY INCLUSION OF A VEGETAL EXTRACT MIX IN GROWING RABBITS: RESULTS FROM EXPERIMENTAL AND COMMERCIAL FARMS

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The effects of incorporation of an essential oils and plant extracts mix in the feed the Digestarom® on the mortality and the growth of rabbits were studied on 19000 rabbits about during 6 experimentation corresponding to different situations. The 3 first ones were localised at the EARL 3L using a restricted non medicated feed distributed; the 3 other ones in a commercial farm with a medicated feed distributed ad libitum. In the 3 trials, a control feed without Digestarom® were compared to a feed with 300 g/ton of Digestarom®. The cumulated mortality for 6 experimentations was lower with the Digestarom® feed. This improvement of the mortality is very close in the 2 studied situations even with the big existing differences between them: 1.66 % for the EARL 3L; 1.75 % for the commercial farm. Globally, the Digestarom® has improved the situation 4 times for the 6 carried out experimentations. Besides, no change was observed at the level weight and growth by Digestarom® incorporation. The feed conversion ratio was statistically lower with the Digestarom® feed compared to the control. In conclusion, the Digestarom® appears to be an interesting solution to decrease the rabbit mortality because conciliating efficiency and palatability and because the regularity of its effects.

EVALUATION OF OAT HAY AND WHEAT STRAW AS A DIETARY COMPLEMENT FOR RABBITS IN TUNISIA

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In vivo digestibility was evaluated for oat hay and wheat straw used as dietary supplements in rabbits. Three experimental diets, a commercial feed or control and two experimental feed were used. Experimental feed were formulated to include 85% and 65% of ad libitum intake of the commercial concentrate and were complemented with 10 and 15% of oat hay, respectively. These diets were fed to 33 California x New Zealand rabbits of 33 days of age. At 50 days of age, animals were fed the same proportions of concentrate as in the first period but were complemented with wheat straw. The complementation of rations with 8-10% of oat hay or wheat straw had no negative effect on dietary digestibility (average energy digestibility was 55.6%). However, when 15% of forages were used, the dietary digestibility decreased to 48.9 and 52% for diets with oats hay and wheat straw, respectively. The use of wheat straw in the ration of rabbits resulted in a better digestibility than the use of oat hay. However, this method did not lead to an accurate feedstuff evaluation because diet digestibility varied with the intake level.

USING WEANING DIETS WITH LOW PROTEIN CONTENT

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A total of 72 rabbit does and their litters standardised at partum were used to study the effect of two diets (P10 and P12) with low digestible protein content (9.8 and 12.3%, respectively) during lactation and growing periods. The rabbits during fattening period were allocated individually (144 rabbits) or in groups of 8 rabbits each (592 rabbits). Does and litters (36 by group) received the experimental diet during lactation from 17 to 28 days post-partum (weaning day) and growing rabbit received the same diet from this moment to 49 days of age, then both groups was feed with a commercial fattening diet from 49 to 60 days of age. Does given P10 diet showed a lower feed intake (332 g DM/day with P10 diet vs. 351 g DM/day with P12 diet), with a litter loss of live weight (-50 g/day) and body condition (-0.2 mm of perirenal fat thickness) from 17th lactation day to weaning. The lower dietary protein content significantly decreased the feed intake of fattening rabbits (44.75 g/day with P10 vs. 73.32 g/day with P12, from 28 to 49 days of age) and growth (17 g/rabbit and day for P10 vs. 22 g/rabbit and day for P12), consequently the live weight at the end of fattening period (60 days) was lower (1962 g for P10 vs. 2074 g for P12).

PATHOLOGY

ENTEROCOCCUS HIRAE ASSOCIATED TO LOCATING RABBIT DIARRHOEAS

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This is the first description of a disease in rabbits associated with *Enterococcus hirae* infection. *E. hirae* was isolated from 5-7 days old diarrhoeic suckling rabbits and from 10-18 days old suckling rabbits that also showed alopecia. They came from an industrial rabbit farm. The offspring of primiparous lactating does were the most affected ones with a prevalence of 85%. A total of 45 samples were analyzed, 29 from digestive origin and 16 from farm premises. The brush border of small intestine villi in affected animals was multifocally coated with numerous adherent gram-positive cocci and no significant inflammation was observed. *E. hirae* was isolated from 100% of 5-7 days old affected rabbits, from 70% of 10-18 days old animals and from several ambient samples. No other pathogens were detected.

Forty-two *E. hirae* isolates were analyzed by sequencing the 16S rRNA gene revealing that all were genotypically identical. They were also genetically characterized by PFGE and displayed undistinguishable PFGE macrorestriction patterns indicating that all clinical isolates represent a single strain.

COMPARISON OF THE CLINICAL EVOLUTION WHEN NEOMICINE OR APRAMICINE WERE USED TO CONTROL A CASE OF ENTEROCOLITIS

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In order to compare three different in-feed treatment regimes after weaning a study was performed in two different farms in Spain with clinical history of enteric problems related with colibacillosis associated to enteropathy. The treatments compared were the following: Control (C), Neomycin at 220 ppm (N), and Apralan® at 100 ppm (A) during 2 weeks. All three treatments included zinc-bacitracine and tiamuline. In the first farm, 200 weaned rabbits were included in each treatment group, while in the second farm only 130 rabbits were included per treatment. Clinical evaluations were performed in order to monitor the evolution of enteric disease in the farm; also, when mortality occurred, necropsies were done and gross characteristic lesions identified. In farm 1 there was a reduction of the clinical symptoms when using apramycin compared to the neomycin and the control group however this difference was not significant. Also, a lower percentage of mortality was reported A=11.5% vs C=19.0% ($P<0.05$) and N=15.5% (ns). However, in farm 2 there was a very little reduction of the clinical symptoms when using apramycin compared to the neomycin and the control group. In both farms, the post-mortem evaluations showed a higher presence of enteropathy and colibacillosis related lesions in control group than in the apramycin treated groups ($P<0.05$). In conclusion, the use of apramycin in at risk farms with history of enteric problems reduces the clinical impact of colibacillosis associated to enteropathy.

EVOLUTION OF THE RESISTANCE TO ANTIBIOTICS FOR *STAPHYLOCOCCUS AUREUS* IN RABBIT FARM

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In this work the evolution of the *Staphylococcus aureus* resistance to 11 antibiotics in samples obtained from 38 rabbitries during a period of 7 years has been analyzed. An increased in the appearance of antibiotic resistances has been observed.

EVALUATION OF THE EFFECT OF THE ANTIBIOTHERAPY IN THE HUMORAL IMMUNITY AGAINST MYXOMATOSIS IN RABBITS

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The main objective of this experimental study was to determine whether the administration of antibiotics in foodstuff or drinking water to prevent/treat possible

enteric disturbances in fattening rabbits can interfere with the development of the immunity induced by the vaccination against Myxomatosis. The results obtained showed that all the antibiotic treatments tested seem to decrease the humoral response. From these treatments, Bacitracin/Tiamulin/Colistin premix administered through the granulated foodstuff for 14 days showed the highest interference level with the immune response, whereas the administration of Enrofloxacin in the drinking water for 5 days showed the highest immune response.