

ABSTRACTS OF THE 44TH SYMPOSIUM ON CUNICULTURE, ASESCU**ARANDA DE DUERO, SPAIN, 5TH-6TH JUNE, 2019.**

The 44th Congress of the Spanish Association of Cuniculture (ASESCU) was held in Aranda de Duero (Burgos province, Castile and Leon region, Spain) from 5th to 6th June 2019, hosted by the trade union 'Unión de Campesinos de Burgos'. The six main talks largely focused on the reasons behind rabbit meat consumption and how to promote it. The first explained the evolution of meat consumption by humans, the second analysed the environmental impact of livestock and the third showed efficient advertising strategies. Another talk explained the strategic approach of the rabbit meat promotion campaigns carried out in Spain in recent years. Finally, the Director of the Rabbit Meat Marketing Board (INTERCUN) spoke about the need for research, development and innovation in rabbit farming. The closing speech proposed what to do to achieve better rabbit meat sales based on current food market trends. Moreover, a total of 22 communications were presented in working sessions with oral communications and posters (nutrition, pathology, housing and welfare, and reproduction and genetics). The meeting was attended by around 170 participants from several European, American and African countries. Abstracts of the contributions submitted are reported below.

MAIN PAPER**WHAT DO WE HAVE TO DO TO SELL OUR PRODUCT BETTER? REVIEW OF CURRENT FOOD MARKET TRENDS AS A BASIS FOR THE GENERATION OF OPPORTUNITIES IN THE COMMERCIALISATION OF RABBIT MEAT****MONTERO L., BUITRAGO J.M., ESCRIBÁ C., BAVIERA A.**

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Since 2012, there has been a decrease in the consumption of fresh meat in Spain, also affecting rabbit meat. Knowledge of the food market is important to find solutions that help mitigate the situation. To this end, specialist companies are continually investigating the markets in order to reveal the trends in food consumption. Knowledge of these trends can help seek both technical and commercial proposals that will have to be assumed by rabbit producers on one hand and the meat industry on the other. These solutions and an adequate communication strategy can be the key elements to improve the consumption prospects for rabbit meat.

NUTRITION**DIETARY PROTEIN OPTIMISATION USING A RABBIT MODEL: TOWARDS A MORE SUSTAINABLE PRODUCTION IN NITROGEN CONTAMINATION****MARÍN-GARCÍA P.J., LÓPEZ M.C., RÓDENAS L., MARTÍNEZ-PAREDES E., BLAS E., PASCUAL J.J.**

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Livestock is one of the main sources of N pollution worldwide. Formulating feed according to the requirements of animals at real ileal level would greatly reduce the excretion of this contaminant. Plasma urea N level (PUN) could be a good indicator of the protein optimisation in the diet. The objective of this work is to propose a model (using growing rabbits) to optimise protein nutrition stepwise. In the first experiment (Exp1), using 918 animals, we evaluated which of the 27 combinations —3 levels of inclusion [M, medium (current); H, high (+15%); L, low (-15%)] for the first 3 limiting amino acids (AA) in rabbits (lysine, sulphur AA and threonine), at faecal apparent level— minimised the PUN. In the second experiment (Exp2), using 116 animals, the productive parameters obtained from the best combination

of Exp1 were compared with the current recommendations and apparent ileal digestibility of feeds was determined. From the results of Exp1, it was observed that the combination of AA that minimised the PUN values was MHL (for lysine, sulphur and threonine, respectively). In addition, in the Exp2 it was found that, with the MHL feed, both the growth rate and the feed conversion ratio were improved ($P<0.05$). Therefore, the recommended proportions in growing rabbits are 5.2, 4.7 and 3.0 g/kg of lysine, sulphur and threonine digestible at the ileal level, respectively. This model can be used to optimise the diets of other zootechnical species and reduce N contamination.

DETERMINATION OF THE AMINO ACID REQUIREMENTS OF GROWING RABBITS AT DIGESTIBLE APPARENT ILEAL LEVEL

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Ileal digestibility is the best indicator of the nutritional use of animals, but this knowledge is scarce for growing rabbits. This same research group verified the combination of total amino acids (AA) (Lysine=Lys, sulphur AA=sAA and Threonine=Thr) that improved protein synthesis and maximised the productive traits. The objective of the present work is to determine the needs of ileal digestible AA of both this new combination (MHL) and the current recommendations (MMM). A test (between 28 and 63 d of age) was performed on 30 rabbits from R line, selected for average daily gain; animals were randomly assigned to one of the two different diets formulated starting from the same basal mixture, according to the current recommendations for all nutrients except sAA and Thr. After slaughter (day 63 of life), the ileal content was collected and analysed. The coefficients of ileal digestibility were equal between the experimental diets, but a tendency was observed ($P>0.05$) to improve the digestibility when the AA levels were higher (the addition was performed with highly digestible AA). Finally, the current digestible recommendations at ileal level are established as 5.2, 3.6 and 4.3 g/kg of dry matter (DM) of Lys, sAA and Thr, respectively. The new combination, which improved production traits, health and protein utilisation, is situated with values of 5.2, 4.7 and 3.0 g/kg of DM of Lys, sAA and Thr, respectively.

EFFECT OF GALACTOMANNAN INCLUSION IN DIETS WITH DIFFERENT SOLUBLE FIBRE ON DIGESTIBILITY AND CAECAL ACTIVITY IN GROWING RABBITS

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Rabbit meat production is highly dependent on the use of antimicrobials, so it is advisable to look for alternatives. The non-digestibility of a galactomannan (GM) of fenugreek seeds by gastric and small intestine enzymes and its high fermentability by caecal bacteria have been demonstrated in a previous work. In this work, this GM is proposed as a soluble fibre that can have a prebiotic effect for growing rabbits. A fattening trial was carried out (from 28 to 63 d of life) with 216 weaned rabbits. Animals were individually housed in 4 treatments (without antibiotics) in a factorial design (2×2), including 2 levels of soluble fibre, with and without GM: H (high soluble fibre), L (low soluble fibre), HAM (high soluble fibre +1% GM) and LGM (low soluble fibre +1% GM). H and HGM feeds reduced feed intake, digestibility of nutrients and mortality ($P<0.001$) compared to L and LGM. However, L and LGM feeds increased the digestibility of crude protein and fibrous fractions. LGM increased ($P>0.05$) the digestibility of neutral detergent fibre on 2.6 and of acid detergent fibre on 1.3 percentage points in comparison to L feed. Regarding the caecal activity, a significant increase in the concentration of caproic acid was observed in GM groups ($P<0.01$), which suggests a different microbial activity. Dietary inclusion of 1% of GM could improve the digestibility of the fibrous fractions and modulate caecal activity of growing rabbits. However, it would be advisable to determine its effect on the caecal microbiota for greater knowledge about the potential of this GM as a prebiotic for rabbits.

EFFECT OF XYLO-OLIGOSACCHARIDES SUPPLEMENTATION IN DRINKING WATER AND LEVEL OF DIETARY SOLUBLE FIBRE ON GROWTH PERFORMANCE AND DIGESTIVE TRAITS IN RABBITS

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The aim of this work was to evaluate the effect of XOS supplementation in water and its potential synergy with soluble fibre on growth traits and digestive tract physiology. Six treatments were applied in a factorial arrangement (3 levels of XOS in water [0, 4.0 and 8.0 g/L] \times 2 levels of soluble fibre in the feed [8.8 vs. 12.9% dry matter]). A

total of 282 weaned rabbits at 35 d were used. Faecal digestibility was determined from 40 to 43 d of age and at 46 d the XOS supplementation was suspended and 48 kits were slaughtered to determine the volatile fatty acids (VFA) in the digesta. XOS supplementation improved growth rate and feed efficiency from 35 to 46 d of age (14%, $P=0.033$) and tended to reduce the mortality in this period ($P=0.10$) without modifying feed intake or the digestibility of energy and protein. At the end of the fattening, only a linear improvement in feed efficiency of 6.7% was observed when supplemented with XOS. The XOS scarcely modified the concentration of VFA in the ileum and caecum and did not affect the digesta pH, without showing interactions with the level of soluble fibre. The increase in the level of soluble fibre reduced the mortality in the whole experimental period ($P=0.002$), tended to improve feed efficiency ($P=0.075$) and increased the digestibility of gross energy ($P=0.009$), and the concentration of VFA in the ileum (9.16 vs. 5.75 mmol/g, $P<0.001$) and in caecum (88.7 vs. 69.8 mmol/g, $P<0.001$).

EFFECT OF XYLO-OLIGOSACCHARIDES SUPPLEMENTATION IN DRINKING WATER AND FEED RESTRICTION ON DIGESTIBILITY AND GROWTH PERFORMANCE IN RABBITS.

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The aim of this work was to evaluate the effect of xylo-oligosaccharides supplementation water (XOS) and its potential synergy with feed restriction on the digestibility and growth traits of rabbits. Four treatments were used in a factorial arrangement: 2 levels of XOS (0, and 7.5 g/L) × 2 feeding systems (*ad libitum* and restriction from 32 to 51 d of age). The restricted group received a ration that was initially 50% with respect to the *ad libitum* group at weaning and increased linearly until 100% of intake of the *ad libitum* group at 51 d of age. A total of 236 rabbits weaned at 32 d of age and with no medication were used. Faecal digestibility was determined between 39 and 43 d of age (9/treatment), and at 59 d of age 10 rabbits/treatment were slaughtered to evaluate dressing out percentage. XOS supplementation improved energy and protein digestibility ($P=0.028$), and reduced feed intake ($P=0.014$) over the whole period, but also tended to reduce the growth rate and increase mortality (both $P=0.12$). Feed restriction improved energy and protein digestibility ($P\leq 0.013$). In restricted rabbits (71% restriction, on av.), the growth rate worsened by 5% over the whole period (32-59 d), obtaining rabbits 75 g lighter

at 59 d of age ($P=0.037$), but improved feed efficiency by 12% ($P<0.001$), with no effect on dressing out percentage (57.8% on average). Feed restriction reduced mortality: 22.5 vs. 4.0% ($P<0.001$). No interactions were observed between XOS supplementation and feed restriction.

EFFECT OF STARCH TYPE AND SOLUBLE FIBRE LEVEL ON GROWTH PERFORMANCE IN GROWING RABBITS

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The aim of this work was to study the effect of supplementation with 2 levels of soluble fibre (FS) (low: 6.4 and high: 10.6% dry matter) combined with 2 sources of starch: wheat (with rapeseed meal) and pea, on faecal digestibility and growth traits of growing rabbits. We used 160 rabbits weaned at 25 d of age and housed individually. The increase in the level of soluble fibre impaired the faecal digestibility of the protein ($P<0.001$), without modifying the digestibility of energy, which reduced the digestible protein/digestible energy ratio ($P=0.007$). Substitution with the wheat-rapeseed meal combination did not modify the faecal digestibility of energy and protein. No interactions were observed between the soluble fibre and the type of starch. The productive yields from 25 to 37 d were not affected by the soluble fibre, but the rabbits fed with the pea feed consumed 15% more feed ($P=0.002$) and tended to grow faster ($P=0.085$), and did not modify their feed efficiency. In this period, mortality was not affected by the treatments. In the whole fattening period, an increase in feed intake of the rabbits fed with pea was confirmed (by 8%; $P=0.003$), but it did not improve the growth rate, resulting in a reduction in feed efficiency (by 7%; $P<0.001$), whereas soluble fibre did not affect growth traits. Mortality in the global period tended to increase in all groups, except for rabbits fed low soluble fibre combined with wheat ($P\leq 0.090$).

PATHOLOGY

HOW GENETIC SELECTION AFFECTS GROWTH RATES IN LEUCOCYTE POPULATIONS OF BREEDING FEMALES OF A PARENTAL LINE

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The selection by different productive parameters (generally reproductive and weight gain) that is carried out in the different lines of rabbits is essential to improve farm productivity. However, when some parameters are selected, other aspects could be selected that may negatively affect the productivity or sanitary status of the animals. In this study, we examined how the selection by average daily gain (ADG) affects the immune populations of the breeding females of a parental line (R line) during the beginning of their productive life under normal production conditions. To do this, blood was drawn from 2 groups of rabbits from the R line separated by 15 generations of selection in the first insemination, first and second parturition, and first and second weaning, to evaluate leucocyte populations by flow cytometry. No significant differences were observed in any of the parameters between the 2 groups. However, during the beginning of the productive life of the two groups of rabbits, from the time of the first insemination to the second weaning, a decrease in total T lymphocytes, CD4+ and CD8 +, and an increase in granulocytes, B lymphocytes and the granulocyte/lymphocyte ratio were observed. Therefore, the results of this study indicate that the ADG selection did not affect the immunity of the R line rabbits during their productive cycle.

EFFECT OF GENETIC SELECTION BY GROWTH RATE ON THE IMMUNE RESPONSE TO AN INFECTIOUS CHALLENGE DUE TO *STAPHYLOCOCCUS AUREUS*

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Paternal rabbit lines selected by growth rate show a high incidence of diseases in comparison with other lines. This work aims to evaluate how the selection for average daily gain (ADG) has affected the immune system of rabbits when they face an infectious challenge, through an experimental infection with the bacterium *Staphylococcus aureus*. To this end, 3 groups of animals were established; one with rabbits from 15 generations of selection prior

to the current generation obtained by vitrification (VR18), another with rabbits from the current generation obtained by vitrification (VR36), and the third with rabbits from the current generation without vitrifying (R36), to determine the effect of vitrification on the study parameters. The experimental infection was maintained for 7 d after inoculation of the bacteria, the lesions were assessed and measured daily and blood was extracted at 0, 1, 3 and 7 d post inoculation to evaluate leucocyte populations by flow cytometry. The results showed a lower number of animals with lesions and lower lymphocyte counts in the VR36 group compared to the VR18 group. It can be concluded that the genetic selection by growth rate does not seem to have affected the immunological status of breeding females at the age of first artificial insemination when confronted with an infectious challenge with *S. aureus*.

DETECTION OF *STAPHYLOCOCCUS AUREUS* IN WILD RABBITS

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Staphylococcus aureus is one of the most frequent pathogens in rabbit farms. However, there is little information about these bacteria in wild rabbits. These animals could be a source of infection for people and other animals, especially methicillin resistant strains (MRSA). For this reason, we wanted to determine the prevalence of *S. aureus* in wild rabbits, the genotypes that were more frequently detected, and the prevalence of methicillin resistance in isolated strains. We observed that 17.4% of the animals were positive for *S. aureus* and 8.7% of the animals were positive for the *mecC* gene, all of these being type B4. The types found in this study differ from previous studies of rabbit farms, indicating a possible adaptation of *S. aureus* strains to wild rabbits. These results highlight the need to continue studying this type of rabbits, in which the presence of MRSA strains has been already demonstrated, as they are in contact with other animal species and hunters.

ENTEROPATHOGENIC *BACTEROIDES FRAGILIS*: EMERGING DISEASE OR CLINICAL FINDING?

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This communication analyses three cases, which appeared at different times and in different farms, of pre-weaning diarrhoeal processes with a different pattern to the processes that usually appear in the daily work of a field veterinarian. In some of the cases, in the absence of results using the usual analytical procedures and given the severity of the processes, which even put the viability of the farm at risk, we decided to look for other possibilities in a centre specialised in rabbit microbiota, namely the CReSA. Therefore, we got in touch with Ignacio Badiola, director of the BACPAR subprogram (Bacterial, Parasitic and Antimicrobial Resistance) and isolated enterotoxigenic *Bacteroides fragilis*, carrier of the BFT gene. Although *B. fragilis* is a habitual and desired inhabitant of the digestive tract of rabbit species, it is the first time, to our knowledge, that the BFT gene has been isolated, in principle pathogenic for all species, in a commercial farm. Although it seemed clear to us that this was a relatively important clinical finding, 2 more cases appeared, and as it was communicated to other clinical veterinarians, there were still other cases. This made us think that it was not just an isolated finding. Although reproduction of the disease at laboratory level in 3-d kits has been described, the disease has not been reproduced in animals aged 21-27 d and with the infective material from a problem farm. We therefore cannot absolutely guarantee that it is a new pathology, but the symptoms are so clear and the result of autovaccination makes us think that we are dealing with an emerging pathology.

HOUSING AND WELFARE

MEASURES FOR RABBIT HEALTH AND WELFARE ASSESSMENT: DESCRIPTIVE RESULTS FROM ONE PRODUCTION CYCLE IN COMMERCIAL FARMS

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An objective protocol of rabbit health and welfare assessment has been developed using animal-based and resource and management-based measurements. Time

points selected to apply the protocol are the end of the lactation period for the reproducing sector and 1 wk before slaughter for the fattening sector. Currently, the protocol is under test on 12 commercial farms in Italy. Results from the reproducing sector obtained in one productive cycle showed that environmental parameters are within the adequate range for rabbit comfort. Some 75% of the examined does had an adequate body condition score, whereas the extreme values (cachexia or obesity) represented only 4%. The main health problem observed in does and kits was diarrhoea (average prevalence 9.3% of does and 2.5% of litters).

STRESS AND PRODUCTIVE LIFE IN RABBIT DOES

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The productive life of 110 rabbit females was measured over 4 or 5 parturitions. Half of them were allocated to individual cages and the other half to a mixed housing system (collective pens during pregnancy and late lactation and individual cages from near parturition to 18 d post-parturition). Cortisol content in hair of 31 females at first insemination and second and fifth weaning, and cortisol content in faeces of 20 rabbit does at insemination and 17 d post-parturition at first and fourth parturition were analysed. Productive lives were shorter in collective pens related to individual cages (170 vs. 211 d), cortisol in hair increased more at first parturitions (0.65 vs. 0.12 ng/g) but were similar over the complete period (0.80 ng/g). Faecal cortisol readings were higher at first parturition in collective pens (100 vs. 77 ng/g), but not at fourth parturition (about 40 ng/g). The results could indicate a higher stress in rabbit does at first parturition in collective pens vs. individual cages that affects productive life due to early elimination of rabbit does (27 vs. 9%).

SEASON, GROUP SIZE AND STOCKING DENSITY WITH YOUNG RABBIT FEMALES AND PRODUCTIVITY

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The growth, injuries at insemination (from 0 to 3) and productivity of 115 young rabbit females were measured from 12 wk of age to first parturition, in 2 periods, spring

and summer. Half of them were allocated to large cages (16 to 24 rabbits) and the other half to small cages (2 to 4 rabbits), as well as at 2 stocking densities (33 and 20 kg/m²). After insemination, half of them were allocated to individual cages and the other half to a mixed housing system (collective cages during pregnancy and late lactation, and individual cages from near parturition to 18 d post-parturition), and litter size at partum, weaning and slaughter were recorded. Young rabbit females' growth from 12 wk to insemination age was lower in summer than in spring season (18.6 vs. 24.8 g/d) and in large cages than in small ones (20.2 vs. 23.2 g/d). The injury scores were higher in large cages (0.8 vs. 0.5), at higher stocking density (0.9 vs. 0.4) and during spring season (1.17 vs. 0.12). The productivity at first parturition was affected only by allocation after insemination; litter sizes at partum were lower in collective pens (8 vs. 9.9), but the mortality rates after the weaning period were lower (18 vs. 26%), and, consequently, the litter size at slaughter time was higher (7.4 vs. 6.4) than in individual cages.

FIELD TRIAL: COMPARING MATERNITY PLATFORM-CAGES VERSUS CONVENTIONAL ONES

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Larger individual cages for rabbit does with platform (PI) were compared with conventional cages (Es) in 2 farms, using 56 does per group, over 6 reproductive cycles. No differences were found related to productivity, but mortality during lactation and loss of litters were higher in PI group than in Es group (11 vs. 9.1% and 5.6 vs. 2.6%, respectively), the weight of weaned kits was lower (1005 vs. 1032 g) and feed conversion during lactation was higher (2.9 vs. 2.5). Doe aggression increased in PI cages compared to Es ones (2.2 vs. 0.4%) and more cleaning tasks were required (13 vs. 0.9% of the cages) every cycle.

METABOLIC AND STRESS INDICATORS AFTER FEED INTAKE ADJUSTMENT IN PRIMIPAROUS PREGNANT RABBIT DOES

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The aim of this study was to determine whether a food intake adjustment (105 g/d) during gestation applied to primiparous rabbit does would affect their metabolic and stress parameters. The rabbit does were divided into 4 different groups according to the duration of the food intake adjustment: mothers were fed *ad libitum* throughout pregnancy (control group, n=30), mothers were fed up to 60% of their voluntary intake during the first week of pregnancy (group R07, n=31), during the second and third weeks of pregnancy (group R721, n=31) or during the first three weeks of pregnancy (group R021, n=30). On the fourth week of pregnancy, all groups were fed *ad libitum*. Blood samples were taken on the day of insemination and, after the pregnancy diagnosis, pregnant animals from the 4 groups were sampled at 3 gestation points: day 14 (n=20), 21 (n=20) and 28 (n=20). After parturition, the females were re-inseminated on the 14th day post-partum and samples were taken at another 3 points of lactation: day 7 (n=13), day 14 (n=13) and day 30 (n=41). Free triiodothyronine (T3), thyroxine (T4) and corticosterone were analysed by enzyme immunoassay. The adjustment of feed intake during pregnancy applied in primiparous rabbits slightly affected the energy homeostasis of the animals, but their welfare status was not compromised.

PEN ENRICHMENT OF THE ITALIAN UNDERGROUND CELL SYSTEM FOR OUTDOORS RABBIT KEEPING

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To reduce structural building costs and improve hygienic conditions for the production of organic rabbit meat according to official Spanish rules, a 2 m² pen was added at the same level as an Italian underground shelter system, which allows us to produce a very well marketed rabbit high quality meat. The circadian behaviour of a doe, previously conditioned not to soil the floor, was observed by a web camera for 53 d. One shot each minute provided 1440 daily images, which were analysed to check the behaviour of the doe in the three different parts of the unit (underground shelter, cage and park) and the frequency

of passage from one environment to the other. All parts of the enriched system were used by the doe, and the whole system remained perfectly clean, needing no extra work. Considering the very positive result, the tested model has been patented.

REPRODUCTION AND GENETICS

SELECTION FOR INTRAMUSCULAR FAT MODIFIES DIGESTIVE MICROBIOME IN RABBITS

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In this study, we investigate the correlated responses to selection for intramuscular fat (IMF) in the caecum microbes' genome. Distinct microbial genes between the 2 lines were identified using Projection to Latent Structures Discriminant Analysis (PLS-DA). The final model including 105 microbial genes showed a Q^2 of 91.6%. From those, 18 genes were involved in the energy metabolism pathway. These genes showed different relative abundance in the high and low IMF lines. Two genes involved in methane metabolism and 2 involved in the metabolism of mannose and fructose were more abundant in the high line, and 2 genes related to lipopolysaccharides biosynthesis were more abundant in the low line. Our study highlights the importance of the gut microbiome in the muscular lipid deposition in rabbits and shows that selection for IMF led to a correlated response in their metagenomics profile, particularly in the energy metabolic routes. These results highlight a relationship between the genes of the individual and the genes of its gut microbes.

GENETIC SELECTION TO IMPROVE FEED EFFICIENCY IN RABBITS RAISED IN COLLECTIVE CAGES USING ELECTRONIC FEEDERS

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The objective of the work is to present the selection process that is being carried out to improve feed efficiency in 3 sire rabbit lines, which is currently in the second generation of selection. Lines are composed of 56 females and 16 males. Line RFI is selected to reduce individual residual feed intake; line ADGR is selected to increase the growth on feed restriction; and line GRP to reduce cage residual feed intake, with the cage as selection unit. The

estimated heritability of residual feed intake in the RFI line was 0.18 (0.11) and that corresponding to daily weight gain corrected for feed intake in the ADGR line was 0.10 (0.09). These are medium-low values which, despite having associated large estimation errors, allow us to envisage a response to selection in the expected direction. The average differences for growth and feed intake between selected animals and non-selected animals are established fundamentally for growth in the ADGR line and for feed intake in the RFI line. In the GRP line, as records refer to cage averages, the variation is much smaller and the magnitude of the differences varies, even changing the sign, depending on the sex and the considered trait.

FEED EFFICIENCY ANALYSIS IN GROWING RABBITS SELECTED FOR DIFFERENT OBJECTIVES

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The objective of the study was to analyse the food efficiency for maintenance and for growth in 2 rabbit lines selected for different purposes. The trial was developed with 53 rabbits of both sexes housed individually belonging to the Caldes (C) lines, selected for growth in fattening, and Prat (P), selected by litter size at weaning. The animals were divided into 3 groups and were fed *ad libitum* during phase 1 (60 and 64 d of life) and under restriction (65 to 67 d), and *ad libitum* in phase 2 (68 to 71 d), and under restriction (71 to 74 d). The restriction levels for each group were 90, 80 and 70%, respectively, of their maintenance needs during the first restriction period, and 60, 50 and 40% in the second. The increases in weight and daily feed consumption were related for each line and phase by regression spline lines that cut the axis of ordinates at the point (CPCm, 0) where CPCm is the amount of feed consumed when the weight of the animals does not change, and corresponds to the maintenance needs when the animal is not fasting. The CPMC estimates were 111.6 and 88.9 for the first and second phases, respectively, on line C, against 82.7 and 73.6 on line P. Slopes during the *ad libitum* periods, which correspond to food efficiency for growth, were similar for both lines (0.57 and 0.70, phases 1 and 2, line C; 0.47 and 0.63, line P). During the restriction periods, the slopes, which correspond to food efficiency for maintenance, did not differ between lines in the first phase of the experiment (1.48 line C, 1.73 line P) but during the second phase (1.44 line C, 0.97 line P).

GUT MICROBIOTA OF RABBIT FEMALES ACCORDING TO ANNUAL REPRODUCTIVE SUCCESS AND AGE

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We studied the richness and evenness of bacterial community in hard faeces samples from adult rabbit females according to their annual reproductive success and age. The annual reproductive success (number of offspring sold in 1 yr) did not explain the observed variability in these parameters. However, the age-related factor explained the observed variability. Species richness of faeces from young animals (first artificial insemination, AI) was 1.6 times higher than that observed in animals inseminated 9 times ($P<0.05$). With respect to the evenness, we observed a reduction of 2.0 times between AI1 and AI9 ($P<0.05$).

EFFECT OF BODY CONDITION ON FERTILITY

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The objective of this study was to analyse the effect of body condition on female receptivity and fertility. A total of 119 primiparous rabbit does were weighed 10 d after delivery, i.e. mating of their third gestation, and fat deposits were measured through the perirenal fat thickness using ultrasound images. Weight and perirenal fat thickness were similar between receptive and non-receptive primiparous females to the first mating after postpartum. Rabbit does pregnant showed a greater weight (+0.18 kg) and a greater perirenal fat thickness at mating (+0.36 mm) than those non-pregnant. The logistic regression analysis showed that weight and perirenal fat thickness were not related to the probability of the female accepting mating ($P>0.10$). Receptivity is only affected by season, e.g. the probability of acceptance the mating is lower in winter than in both spring and summer. Weight and perirenal fat thickness showed a positive relationship with the probability of the female becoming pregnant ($b=1.27$ and $b=0.62$ respectively, $P<0.10$). In conclusion, body condition does not affect the female's receptivity, but affects its fertility.