

**ABSTRACTS OF THE “22<sup>nd</sup> HUNGARY CONFERENCE ON RABBIT PRODUCTION”****KÁPOSVÁR, HUNGARY, MAY 26, 2010**

About 80 participants took part at the 22<sup>nd</sup> Hungarian Conference on Rabbit Production at Kaposvár, organized by the University of Kaposvár, the Hungarian Branch of the WRSA, the Rabbit Production Board and the Agribrands Europe Hungary Inc. This is the largest and most popular event of the rabbit breeders in Hungary. A total of 18 papers were presented by senior and young scientists. The topic of the papers covered all fields of rabbit production (production, housing and welfare, reproduction, genetics, nutrition, pathology). Full papers are available from the organizer (Szendro.Zsolt@ke.hu) on request.

**SITUATION OF RABBIT PRODUCTION IN HUNGARY IN 2009**

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In 2009, the total quantity of the Hungarian rabbit production was 9700 tons in live and 4900 tons in carcass. Most of the carcass (meat) was exported to Italy, Switzerland, Germany and Russia. Related to the total production the ratio of the export was about 94-95% so the purchase of rabbit meat in the Hungarian market is only 5-6%. The proportion of rabbits produced in small farms was about 4-5%. The cost of production (mainly feed cost) and the price of rabbits paid to the farmers were stable during the last year, but the profitability of rabbit production is low. There is no correct estimation about the home consumption.

**CHANGES IN NUMBER OF RABBITS IN COUNTIES OF HUNGARY BETWEEN 2005 AND 2009**

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Currently even farmers hardly know the distribution of the total number of rabbits in Hungary. This study was carried out to determine the allocation of rabbits and the number of rabbits per 100 capita between 2005 and 2009 by evaluating statistical

data. The results showed that 70% of total rabbits are centralized in 4 counties out of 19. Pest County has 27% of the total number of rabbits, while the highest alteration since 2005 belongs to Jász-Nagykun-Szolnok County (up from 27000 to 127000 rabbits). Szabolcs-Szatmár-Bereg County decreased in the number of rabbits the most, 2% of the quantity in 2005. When comparing the number of rabbits per 100 capita data showed similar results. While there are more than 30 rabbits per 100 inhabitants in Jász-Nagykun-Szolnok County, Szabolcs-Szatmár-Bereg County has less than one.

**THE ROLE OF BODY CONDITION ON NEW FEEDING AND BREEDING PROGRAMMES FOR REPRODUCTIVE RABBIT DOES**

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The present work reviews the main efforts made in recent years to determine how body condition interacts with rabbit female performance and the central role of reserves management in the definition of adequate feeding and breeding programmes for reproductive rabbit does. To a great extent, future reproductive potential of reproductive rabbit females is decided before first partum. There seems to be enough evidence of a possible threshold for the rabbit female birth weight to reach the beginning of reproductive life

in a suitable body condition to maximise their future reproductive potential. The moment of first mating could be identified as another crucial point in the development of the young female. This is the last 'pure' data of the animal, sign of the animal soma and probably related to their productive potential. From this moment on, all their records will be conditioned to their reproductive history. The choice of an adequate feeding system during rearing and first pregnancy also seems to be relevant in the reproductive performance of rabbit females in the short and long term. This should allow young females to reach first mating and late pregnancy with a good maturity level, but over-fattening must be avoided to reduce the risk of pregnancy toxemia and reduced reproduction. The body condition of the females changes during the reproductive cycle and throughout their reproductive life according to their genetically determined level. The problems appear when the animals are forced to differ from this adequate level, increasing susceptibility to disease, other stress factors and eventual failure. The body condition of young rabbit females reaches the peak 10 d before kindling. From this moment to kindling, reproductive rabbit does seem to suffer the highest mobilisation of body reserves, with the body condition showing the lowest level at partum. Negative energy balances detected during lactation do not seem to have the strength of those observed in late pregnancy. Therefore, the main risk of unbalance should be those programmes which would not allow recovery of the adequate soma of the female 10 d before partum, as the effort will be great and inevitable. Genetic selection in rabbit by litter size at weaning has increased prolificacy but also the ability to obtain resources (more feed intake at the onset of lactation, better energy utilisation during pregnancy), without compromising the survival of rabbit females. Finally, rabbit does selected for reproductive longevity have a greater soma (live weight and body condition), which enables them to better cope with the possible productive challenges that they may meet in the course of their productive life. There is also evidence that they have greater plasticity in using their soma, making them more robust to overcome demanding situations.

## HOW TO PREPARE RABBIT DOES TO INSEMINATION? A REVIEW

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After a brief analysis of the main factors of success of

insemination, this review describes some methods suitable for oestrus induction in order to improve reproductive efficiency of rabbit does in term of fecundity (combining fertility and prolificacy). Parity, lactation status, pseudopregnancy as well as sexual receptivity at the time of insemination highly influence reproductive performance. Pseudopregnancy (ovulation non-induced by GnRH or mating) strongly depresses fertility, but the causes of these ovulations are still unknown. The routine use of eCG (or PMSG) on lactating does consistently increases the proportion of receptive does at the time of AI and, therefore, their long-term productivity, without any important side-effect. Applied just before insemination, different alternative methods have been studied: animal manipulation (a change of cage, does gathering), a "buck" effect, a short dam-litter separation, feeding programmes and light stimulations. Some of these methods improve the fecundity, but they sometimes also decrease kits growth (dam-litter separation, lighting programmes...). Consequently, for an optimal application in farms, it is important to consider long-term effects, such as global productivity and persistency of the effects. However, a better knowledge of the underlying physiological mechanisms would allow a better control of reproduction in rabbit farms.

## EFFECT OF RE-INSEMINATION INTERVAL AFTER THE FIRST PARTURITION ON THE PERFORMANCE OF RABBIT DOES

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The objective of the study was to analyze the effect of the resting period's length after the first kindling on the performance of rabbit does. 314 rabbit does - originating from 10 crossing combinations - were randomly sorted to 3 groups and were inseminated 11 (AI-11), 18 (AI-18) or 25 d (AI-25) after the first parturition, respectively. Subsequent inseminations occurred 11 d after kindling. The average conception rates (between the 2<sup>nd</sup> and 7<sup>th</sup> kindling) of the AI-11, AI-18 and AI-25 groups were 68.0; 74.1 and 76.3 (NS), respectively. Number of insemination per kindling only differed at the 2<sup>nd</sup> and at the 5<sup>th</sup> kindling to the advantage

of the AI-18 and AI-25 groups. No significant differences were found for the does' body weight, litter size (total, born alive, alive at 21 d), mortality rate during suckling, and individual and litter weight at 21 d, respectively. Despite of the small individual differences that were recorded for these traits related to 100 inseminations substantial alterations were observed and the total number of kits born, total number of kits born alive, total number of kits alive at 21 d and litter weight at 21 d were 687, 738 and 786; 642, 705 and 724; 504, 553 and 575; 221, 230 and 239 kg for the AI-11, AI-18 and AI-25 groups, respectively. Based on the pooled results after the first kindling it is worth to re-inseminate the does 1-2 wk later (compared to other parities) in order to enable them to regain their condition and show higher production level.

### PRODUCTION OF RABBIT DOES FED BY PELLETS OF LOW AND HIGH FIBRE CONTENTS

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The objective of the study was to evaluate the feed intake, body weight, condition and production of rabbit does fed by pellet of high fibre content. Two groups were formed at the age of 8 wk. The first group (LF; n=20) received a pellet containing 14.5% crude fibre and 10.9 MJ DE/kg. The pellet of the second group (HF; n=20) contained higher fibre content (17.6%) but lower energy level (9.99 MJ DE/kg) compared to the first group. The HF rabbits had higher feed intake and lower feed conversion ratio (5.94 vs. 5.35). At the age of 17.5 wk the body weight of the groups was not different. The condition scores of the groups were also similar (TOBEC values were 1370 and 1408 for the LF and HF groups, respectively). During the first 3 inseminations HF does had slightly higher conception rate (85.7 vs. 72.2%,  $P = 0.144$ ), but their litter weight was significantly higher than that of the LF group (HF: 2933 g, LF: 2525 g,  $P < 0.05$ ). Production of the rabbit does could also be analyzed for large groups.

### PRODUCTION OF RABBIT DOES DEPENDING ON THEIR REARING PELLET'S FIBRE CONTENT AND THEIR AGE AT FIRST MATING

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The objective of the experiment was to examine the effects of the pellet's fibre content (of the rearing period) and age at the first mating on the does' production. Between the ages of 8 and 16 wk the rabbits (n=557) received a pellet with higher crude fibre (CF) content and lower digestible energy (DE) content (HF=CF) 17.6%; 9.99 MJ DE/kg) or a pellet with lower CF and higher DE content (LF=CF 14.5%; 10.9 MJ DE/kg). Both groups were further divided to 3 sub-groups then they were inseminated at the ages of 16.5, 17.5 or 18.5 wk of age (16.5w, 17.5w, and 18.5w). Body weight of the HF does was significantly higher than that of the LF does (4.21 vs. 4.10 kg,  $P < 0.001$ ). No differences were observed between the groups for the other traits (AI/litter, litter size, litter weight). At the 1<sup>st</sup> and 2<sup>nd</sup> parturitions the 18.5w group rabbits had the largest body weight. The AI/litter significantly differed between the groups at the 3<sup>rd</sup> kindling (1.42; 1.18 and 1.13 in the 16.5w, 17.5w and 18.5w groups,  $P < 0.05$ ). At the first parturition significant differences were obtained for the number of kits born alive and for the number of kits at 21 d (7.39 vs. 6.68 and 6.59 vs. 5.96 for the 16.5w and 18.5w groups,  $P < 0.05$ ) while at the 4<sup>th</sup> parturition the number of kits born alive and the number of kits at 21 d showed significant differences (9.37 vs. 11.8 and 8.68 vs. 11.2 in the 16.5w and 18.5w groups,  $P < 0.001$ ). Significant differences were recorded for litter weight at 21 d at the 1<sup>st</sup> (2.71 vs. 2.53 kg,  $P < 0.01$ ), 2<sup>nd</sup> (2.80 vs. 3.13 kg,  $P < 0.05$ ) and 3<sup>rd</sup> (3.15 vs. 2.80 kg in the 16.5w and 18.5w groups,  $P < 0.05$ ) parturitions. As opposite results were found for the successive parturitions among the groups based on the pooled results no significant difference was found for any trait.

## COMPARISON OF REPRODUCTIVE PERFORMANCE OF RABBIT DOES HOUSED INDIVIDUALLY OR IN GROUPS

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There is a substantial disagreement between the viewpoints of the rabbit breeders conducting intensive production and that of those suggesting alternative housing system. The objective of this study was to compare the reproductive performances of rabbit does kept in groups or individually in cages. 17 wk old female rabbits were randomly sorted into 3 groups. In 2 groups the does were individually placed to conventional breeding cages, they were artificially inseminated applying a rebreeding interval of 33 (E33, n=16), or 42 d (E42, n=18). In the 3<sup>rd</sup> group CS, n=16) the rabbits (4-4 does and 1-1 buck) were placed to pens having a basic area of 7.7m<sup>2</sup>. In all groups the results of the first 3 kindlings were evaluated. Besides the reproductive performance the abnormal behaviour forms were also recorded for the does kept in groups. Using the pooled results of the first three kindlings it was observed that half of the does that were kept in groups did not have any parturition, the kindling rate was significantly higher ( $P<0.05$ ) in the E33 and E42 groups (74.0% and 85.4%, respectively). No significant differences were found for the total number of born kits (E33: 9.16; E42: 9.03; CS: 9.81;  $P=0.556$ ) and for the number of kits born alive (E33: 8.81; E42: 8.18; CS: 9.67;  $P=0.128$ ) among the 3 groups. The mortality rate during suckling was significantly higher in the CS group (E33: 18.4%; E42: 14.1%; CS: 39.9%;  $P<0.001$ ). For the annually weaned rabbits per 1m<sup>2</sup> basic area of the rabbit house the performance of the group housed rabbits was only 16% that of the does kept in cages. The survival rate of the group housed does was only 56% until the third weaning contrary to that of the does kept individually (E33: 78%; E42: 81%). Based on the results it can be concluded that the does kept in groups showed lower performances primarily for kindling rate and for mortality rate during suckling compared to does that were placed individually to cages. The high mortality rate during suckling found for the group housed does (scratching,

biting and killing the kits) is alarming from animal welfare aspect.

## ANALYSIS OF THE SUCKLING RABBITS' MORTALITY

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The objective of the study was to analyze the influencing factors of the suckling rabbits' mortality at a high production level Hycrole rabbit farm (producing grand parents). The average mortality rate was low (6.1%). The mortality rate was higher than average at the first and second parturitions (11.0 and 7.8%, respectively) and it raised again after the 17<sup>th</sup>-20<sup>th</sup> kindling. For does with low number of kits born alive (1-2 or 0) but received 10 kits to be fostered the mortality rate was high (11.4 and 14.5%, respectively). The body weight of the does measured at the 4<sup>th</sup> parturition had no effect on the mortality rate. The effect of the number of teats was significant, kits reared by does having 8, 9 and 10 teats showed mortality rates of 7.0, 5.9 and 4.1% mortality ( $P<0.05$ ). Whether the does remained empty or kindled – at the time of the previous insemination - also had effect on the mortality (5.3 vs. 7.8%, respectively). Based on the results the mortality rates can be lowered even at rabbit farms of high production level.

## TEST OF FEED INGREDIENTS AND THEIR EFFECT ON THE PRODUCTION OF GROWING RABBITS

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The study was conducted with 288 singly housed rabbits (n=36/group) and 432 kept collectively (3 rabbits/cage, n=54/group). The 35 d old weanling rabbits were fed 8 isoenergetic, isofibrous and isonutritive growing diets in which a raw material or a feed-product studied was used at 2-7.5% concentration. The control diet (C) contained 31%

alfalfa meal, 12-12% wheat grain and sugar beet pulp, 9% soybean meal and 8-8% sunflower meal and wheat bran. Dietary ratio of these components were differently lowered and substituted with 7.5% apple pulp (diet A), 2% brewer's yeast (diet Y), 5% barley (diet B), 4% locust bean (diet L), 2% hydrolyzed soya-protein concentrate (diet S), 2% or 4% UNILAC, a milk-powder replacer (diet U2 and diet U4). The Pannon white rabbits were fed the growing diets from 35 to 63 d of age and one fattening diet till 77 d old. The growing diets differently affected the 49-63 d growth (41, 44, 40, 39, 43, 37, 38 and 43 g/d in order of the C, A, Y, B, L, S, U2 and U4 groups,  $P=0.01$ ) and 63- d body weight of rabbits (2028, 2067, 1970, 1975, 2042, 1937, 2004 and 2041g, respectively,  $P=0.032$ ). Apart from the worst 35-77 d feed conversion of the U2 rabbits (3.4 vs. 3.1-3.3 in the other rabbits,  $P=0.022$ ) the 35-77 d growth, feed intake and 77- d body weight of the rabbits did not differ significantly. However, the 35-63 d mortality ratio was influenced by the growing diets (24, 15, 34, 33, 20, 29, 28 and 27%,  $P=0.05$ ) and significant differences in mortality were found also regarding the whole rearing period (25, 15, 35, 35, 21, 29, 31 and 29%,  $P=0.05$ ). It was concluded that both apple pulp and locust bean can be recommended as a feed ingredient in growing diets of the rabbits.

### **IN VIVO METABOLISM OF INULIN BY THE RABBIT MICROBIOTA**

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Using inulin as a feed additive in rabbits gave many times controversial results. Therefore 2 *in vitro* experiments were carried out to analyse the effect of incubation the caecal content with inulin, and on the microbiota and VFA production. Ten and 12 wk old Pannon White rabbits were used in experiment 1 and 2, respectively. To obtain caecal samples the rabbits were narcotized by carbo-dioxide, and sacrificed. The caecal content was homogenized, and divided into 2 parts under strictly anaerobic conditions. Sample 1 (n=9) was the control, while 4% inulin was added to Sample 2 (n=9). Samples were incubated at 37°C for 6 and 12 h, respectively. Samples taken after 0, 6 and 12 h of incubation (n=3 at each sampling) were analysed for the composition of the microbiota and VFA content. In both experiments the total VFA increased from

50.1 to 87.6 mmol/kg and from 36.6 to 82.9 mmol/kg, respectively. The ratio (% within total VFA) of acetic acid slightly decreased, while that of the propionic acid remained relatively constant in experiment 1 but increased in experiment 2. Supplementation of inulin had different effects in the 2 experiments. It had a slightly negative effect on the amount of total anaerobic bacteria and coliforms in experiment 2, while it increased the number of coliforms in experiment 1.

### **EFFECT OF SUPPLEMENTATION OF LINSEED OIL, VITAMIN E AND SELENIUM IN PELLET FOR GROWING RABBITS ON PRODUCTIVE AND CARCASS TRAITS**

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The aim of this experiment was to analyse, how additional dietary linseed oil, vitamin E and selenium affects production and slaughter characteristics of growing rabbits. The basal diet (A) contained 3% sunflower oil, while in the experimental feed (K) this was changed to 3% linseed oil. The vitamin E and selenium content of the 2 diets was 60 vs. 260 mg/kg and 0.10 vs. 0.46 mg/kg, resp. Rabbits were fed the A diet from the age of 18 d. One group was fed with the A diet until 11 wk of age, while the experimental groups were fed the K diets for 1, 2, 3 and 4 wk before the slaughter (K1, K2, K3 and K4 groups). The body weight gain, the body weight, the feed intake and the feed conversion ration was identical in all groups. The mortality, as compared to the K1 group (0%) was higher in the in the A group by 13.4% and in the K2 and K3 groups (5.6 and 11.1%, respectively). The dressing out percentage was the lowest in the K1 group (61.7%), while it was significantly higher ( $P<0.05$ ) in the K2 and K3 groups (62.8 and 62.7%). The proportion of the mid part, as compared to the reference carcass was the lowest in the K1 group and the highest in the K3 (31.3 vs. 32.0%,  $P<0.05$ ). The proportion of the hind part was the highest in the K1 group ( $P<0.05$ ) and the lowest in the K2, K3 and K4 groups (38.8 vs. 37.3, 37.2 and 37.1%). The weight of the organs, the proportion of the fore part and that of the perirenal fat was identical in all groups. Comparing these results to the literature it was

found that additional dietary linseed oil, vitamin E and selenium has no or only a slight effect on the production and slaughter characteristics.

## PRODUCTION AND BEHAVIOUR OF GROWING RABBITS DEPENDING ON THEIR GROUP COMPOSITION

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The objective of this study was to analyze the possible effects of the group composition for the production and behaviour. Altogether 168 growing rabbits were evaluated between the ages of 5 and 11 wk. Seven rabbits were placed to each pen (0.9×0.5 m) where the rabbits placed to the same pen were full sibs (FS) of the same (females /F/, males /M/, or of mixed sexes /MS/). The group composition had no effect on the production (weight gain, body weight, feed intake, feed conversion ratio, mortality). No differences were found for the occurrence of the behavioural patterns. Lesions on the body caused by the aggressive behaviour were initially observed at the age of 7 wk and it was more frequent for the F group between the ages of 7-9 wk. On the contrary at the age of 11 wk the occurrence of the lesion was 40.5% in the M group which was higher than that of the other groups (23.8%-28.6%). Based on the results it could be concluded that rearing the rabbits separately in the same sex was disadvantageous.

## GENETIC PARAMETERS OF GROWTH *IN VIVO* CT BASED AND SLAUGHTER TRAITS IN PANNON WHITE RABBITS

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Genetic parameters of average daily gain (ADG, between the ages of 5 and 10 wk), thigh muscle volume (TMV, determined by CT-scan) and hind

part percentage (HPP, compared to the chilled carcass) were estimated in Pannon White rabbits. REML and BLUP procedures were applied using PEST and VCE softwares. The heritability estimate for HPP was high (0.59±0.05). Lower heritability estimates were received for TMV (0.19±0.02) and for ADG (0.30±0.01). The random litter effects were low for HPP (0.07±0.03), TMV (12±0.01) and ADG (0.13±0.01). A favorable genetic correlation was found between HPP and TMV (0.59±0.05).

## THE PROFIT OF THE SLAUGHTERHOUSES REALIZED IN THE COURSE OF CT-AIDED SELECTION

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One of the Hungarian rabbit breeding sector's characteristics is that almost all purchased rabbits are exported while their local commerce is minimal. Meat production is one parameter of meat quality which is continuously gaining importance. Improving the meat production of the Pannon White rabbits began in 1992 with the application of Computer Tomography (CT). The objective of the present study was to examine the efficiency of the CT-aided selection from the viewpoint of the slaughterhouses. Analysis of profitability was made using the data of our previous trials taking into account the price obtained for the whole carcass or for the meat fillet. Supposing the same price of Pannon White (P) and Hycole (H) rabbits (trial 1.) marketing the whole carcasses or the meat fillet products resulted in 19 and 43 HUF/kg extra incomes for the Pannon White rabbits. Supposing a slaughter weight of 2.7 kg this value is 51 and 116 HUF per individual. Comparing P×P and P×H genotypes (trial 2) the advantage of the P×P rabbits was 38 HUF/rabbit and 78 HUF/rabbit for whole carcass or the meat fillet product. Comparing the second generation of the divergent selection for thigh muscle volume (trial 3) after 10 generations marketing the whole carcass or the meat fillet product results 67.5 and 216 HUF extra income per individual (average body weight 2.7 kg) at the slaughterhouse. Supposing the annual slaughter of one million rabbit as a result of the CT-aided selection can increase the profit of the slaughterhouse with 80-100 million HUF. It can be concluded that the selection based on CT data

is highly advantageous for the slaughterhouses because they obtain more lean meat from a CT selected rabbit having the same body weight (ie. for which the slaughterhouse paid the same price) which results in a substantial extra income. Thus it would be worth for the slaughterhouses to pay higher price for these animals and share their extra profit with the producer (1 EURO = 260-270 HUF).

### EXAMINATION OF DIFFERENTLY SPICED RABBIT PRODUCTS BY MEANS OF ELECTRONIC TONGUE TECHNOLOGY

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Natural and spiced meat samples (Meridian “M”, Kotányi “K”, Asia-mix “A”) were produced from cubed rabbit thigh meat. Following a heat treatment (85°C, 60 min) gravy samples were collected, than the volatile compounds were characterized with an AlphaMos Astree electronic tongue (ET) system in six repetitions. Based on the PCA analysis of raw sensory data an overlap was detected between the natural and Meridian samples. According to this the further DFA analysis was performed on the spiced meat samples only. By the best DFA model results a validation score of 85 with probability values of 0.00; 0.00 and 0.23 in case of A – K, A – M and K - M groups was attained, respectively. In the light of the achieved results the ET technology seems to be a promising tool to classify divergently treated rabbit meat products.

### KLEBSIELLA OXYTOCA ENTEROCOLITIS OUTBREAK IN A HUNGARIAN RABBIT FARM

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*Klebsiella* species, as members of *Enterobacteriaceae* family, includes ubiquitous bacteria found both in the environment and

animals. As opportunistic pathogens they can cause pneumonia and urogenital infections in humans, rodents, carnivores and ungulates, mastitis in ruminants, and septicaemia in a number of species. There is a limited knowledge about the importance of *Klebsiella* infections in domestic rabbits, although *Klebsiella pneumoniae* has been associated with hemorrhagic enteritis and septicaemia in Italy and France. In January 2010, a rabbit breeding farm with 1500 does located in north-eastern Hungary requested evaluation due to an increase in neonatal mortality rates. Does of affected litters had been purchased from a farm from south-eastern Hungary, where our group had also identified similar, although less severe neonatal mortality. Clinical findings and pathological changes were characteristic of klebsiellosis, as described in detail earlier by others. To date this has been only proven with *Klebsiella pneumoniae*, we have described now that *Klebsiella oxytoca* strains are also can be involved in clinical klebsiellosis in rabbit farms. *Klebsiella* species are ubiquitous on animal farms, although klebsiellosis is a relatively rare finding in domestic rabbit populations. When certain predisposing factors present, the disease can be manifested clinically, and can lead to significant economic losses.

### TRANSGENIC RABBIT PRODUCTION WITH LENTIVIRAL VECTOR

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Transgenic rabbit is the preferred disease model of atherosclerosis, lipoprotein metabolism and cardiovascular diseases since upon introducing genetic mutations of human genes, rabbit models reflect human physiological and pathological states more accurately than mouse models. Beyond that, transgenic rabbits are also used as bioreactors to produce pharmaceutical proteins in their milk. Since in the laboratory rabbit the conventional transgenesis has worked with the same low efficiency in the last twenty five years and truly pluripotent embryonic stem cells are not available to perform targeted mutagenesis, our aim was to adapt lentiviral transgenesis to this species. A simian immunodeficiency virus based

replication defective lentiviral vector was used to create transgenic rabbit through perivitelline space injection of fertilized oocytes. The enhanced green fluorescent protein (GFP) gene was placed under the ubiquitous CAG promoter. Transgenic founder rabbits showed mosaic pattern of GFP expression. Transgene integration and expression was revealed in tissues derived from all three primary germ

layers. Transgene expression was detected in the developing sperm cells and could get through the germ line without epigenetic silencing, albeit with very low frequency. Our data show for the first time, that lentiviral transgenesis could be a feasible and viable alternative method to create genetically modified laboratory rabbit.

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