

**ABSTRACTS OF THE 26TH HUNGARIAN CONFERENCE ON RABBIT PRODUCTION
KAPOSVÁR, HUNGARY, MAY 31, 2014**

About 100 participants attended the 26th Hungarian Conference on Rabbit Production at Kaposvár, organised by Kaposvár University, the Hungarian Branch of the WRSA and the Rabbit Production Board. This is the largest and most popular event for rabbit breeders in Hungary. Twenty papers were presented by senior and young scientists. Topics of the papers covered all fields of rabbit production (production, housing and welfare, reproduction, genetics, nutrition, meat quality). Full papers are available from the organiser (matics.zsolt@ke.hu) on request.

**SITUATION OF RABBIT PRODUCTION IN HUNGARY
IN 2013**

JURÁSKÓ R.

Rabbit Production Board, H-2220 Vecsés, Hungary, Széchenyi str. 141.

info@nyultermektanacs.hu

Compared to 2010, purchasing of live rabbits and carcass exports increased by 10%, mainly due to the stabilisation of market conditions. The Euro/HUF exchange rate was favourable from the viewpoint of rabbit meat export, but last year the costs of feed ingredients and pelleted diets increased. The price of live rabbits (about 1.5 Euro/kg live weight) rose slowly. The cost of housing rabbits in alternative systems (rearing on deep litter, etc.) was around 15-20% higher. Small scale rabbit production provides only 1-2% of the total purchased quantity. The contributions of the Pannon rabbits, Hycole, Zika and Debreceni White were 47, 40, 9 and 3%, respectively. There are 60-65 large rabbit farms in Hungary, producing around 101000 rabbit does. The 2 slaughterhouses process 85-90000 growing rabbits per week. Only 1.8-2% of the total rabbit meat production is sold in the supermarkets in Hungary. The aim of the Hungarian Rabbit Production Board is to increase the current growing rabbit production (4.7 million) to 7 million per year by 2020.

**HERBS AND SPICES AS FEED ADDITIVES IN
GROWING RABBITS**

DALLE ZOTTE A.*, CELIA C.*†, SZENDRŐ Zs.†

*Department of Animal Medicine, Production and Health, University of Padova, Agripolis, Viale dell'Università, 16, 35020 Legnaro (PD), Italy. †Faculty of Agricultural and

Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, Kaposvár, Hungary.

antonella.dallezotte@unipd.it

The European ban of the non-therapeutic use of antibiotic growth promoters and limits in the use of other drugs has increased the rate of digestive disorders and mortality in growing rabbits. Researchers and farmers have to find alternative methods to control gut health and productivity of growing rabbits. Herbs, spices and their extracts (botanicals) have been demonstrated to have a wide range of activities, including animal performance and nutrient availability improvement. Plants and their extracts are used in animal nutrition as appetisers, digestive stimulants, stimulants of physiological functions, for prevention and treatment of certain pathological conditions, and as colorants and antioxidants. Digestive effects of herbs and spices were reported mainly in laboratory animals and humans, and few studies were carried out on farmed animals. In the rabbit, the dietary inclusion of fennel seeds with oregano leaves improved the utilisation of diets. Several studies on plant extracts have shown promising results as growth promoters. In the growing rabbit, the mixture of *Lupinus albus* L., *Trigonella foenum-graecum* L., and *Cassia senna* L. as feed additives can be considered a growth promoter. A large number of plant preparations are used as galactagogues. The most frequently used natural products to increase milk production in rabbit does are anise and fenugreek. The antimicrobial effect derives especially from the volatile plant oils. In rabbit, a stabilising effect on the microbiota was observed when diet was supplemented with Digestarom® or thyme oil. When diets were supplemented with thyme and spirulina, an antimicrobial effect on *Bacteroides*, *C. coccoides*, *C. leptum* in the caecum was noticed. The black cumin seeds proved to exert anti-inflammatory, anti-bacterial and

immunomodulatory effects. Several herbs and spices have antioxidant effects through dietary supplementation or inclusion in meat and meat products. Several experiments using herbs or/and spices as feed additives for rabbits have to be carried out before practical proposals can be drafted.

EFFECT OF DIFFERENT GnRH ANALOGUE TREATMENTS ON THE PERFORMANCE OF LACTATING RABBITS

EIBEN Cs.*, SÁNDOR M.†, SÁNDOR F.†, TOKAI A.†, KUSTOS K.‡

*Research Centre for Farm Animal Gene Conservation, 200, Isaszegi Str. H-2100 Gödöllő, Hungary. †S&K-Lap Ltd., 135, Császár Str. H- 2173 Kartal, Hungary. ‡Szent István University, 1, Páter K. Str. H- 2100 Gödöllő, Hungary.

eiben@katki.hu

Reproductive performance of 210 rabbits inseminated on *postpartum* day 11 and induced to ovulate by i.m. 0.84 µg or 1.26 µg buserelin acetate (Receptal® or Suprefact®) or 20 µg gonadorelin (Fertagyl®) or by i.v. 25 µg GnRH analogue [des-Gly10, D-Ala6]-LHRH ethylamine in 0.5 mL semen extender (MRAbit®) were studied according to reproductive status under farm practice (only light stimulation). Pregnancy and kindling rates and the number of live born kits per litter were not affected by the GnRH treatments but differed ($P < 0.05$) with parity and receptivity (94%, 89%, 11.7 in multiparous receptive vs. 77%, 69%, 9.42 in primiparous non-receptive, or 10.2 kits in multiparous non-receptive does, respectively). Global productivity (number of live born kits per 100 AI) with Receptal® in primiparous receptive or non-receptive or in multiparous receptive or non-receptive does were 930, 450, 1020, 787, with Suprefact® 1064, 670, 1209, 895, with Fertagyl® 489, 763, 1003, 832 and with MRAbit® 715, 600, 1010, 850, respectively. With the studied i.m. and i.v. GnRH analogue treatments, the lactating does had good and similar performance under the farm practice of light stimulation with no eCG use before insemination. Reproduction was influenced by doe physiological status. Multiparous receptive does had higher productivity.

EFFECT OF LIGHT INTENSITY ON PERFORMANCE OF RABBIT DOES

MATICS Zs., GERENCSÉR Zs., RADNAI I., MIKÓ A., KASZA R., SZENDRŐ Zs.

Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, Kaposvár, Hungary.

matics.zsolt@ke.hu

The aim of the study was to compare the reproductive performance of rabbit does housed in 2 different

light intensities. The experiment was conducted at the experimental rabbit farm of Kaposvár University. Nulliparous rabbit does ($n=108$) were randomly housed in 2 identical rooms which only differed in light intensity (V group: 150-200 lux; S group: 10-20 lux). In both rooms, a 16L:8D lighting schedule was applied. Rabbit does were first inseminated at 16.5 wk of age. A 42 d reproductive rhythm and single batch system was applied. Production data from the first 5 consecutive reproductive cycles were evaluated. The light intensity did not influence the kindling rate and the body weight of the does at kindling. There was no significant difference between the total born litter sizes of the groups. The live born litter size of V group was higher compared to S rabbits (V: 10.75, S: 10.00, $P=0.043$). There was significantly lower mortality between 0-21 d in group V than that of group S (6.4 vs. 8.7%, respectively, $P=0.013$). The litter size of V rabbits was higher at 21 d and at 35 d compared to group S (at 21 d: 8.86 vs. 8.52; at 35 d 8.75 vs. 8.45 in group V and S, respectively; $P=0.020$ and $P=0.035$). The litter and individual weight at 21 d and at 35 d, and suckling mortality between 0-35 d, did not differ in the 2 light intensities. Calculating the global productivity, the number of weaned rabbits per 100 AI (V: 685, S: 673 rabbits) and the total weight of weaned rabbits per 100 AI (V: 646 kg, S: 636 kg), no differences were found between the 2 groups.

CHOICE OF RABBIT DOES AMONG NEST BOXES DEPENDING ON NESTING MATERIAL

FARKAS P*., SZENDRŐ Zs.*†, MATICS Zs.*†, MAYER A.‡, RADNAI I.*†, GERENCSÉR Zs.*†

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, Kaposvár, Hungary. †Olivia Ltd, 94 Mízse; 6050 Lajosmizse, Hungary. ‡J. Rettenmaier & Söhne GmbH + Co. KG D-73494 Rosenberg, Germany.

farkaspeter@freemail.hu

The experiment was conducted at Kaposvár University. The choice of nest box bedded with different nesting materials (wood shavings, hay, straw and fine fibre material [Lignocel®]) was observed. Preference of 22 multiparous rabbit does in 3 genotypes (Pannon White $n=6$, Pannon Ka $n=6$, Pannon Large $n=10$) was studied. In each wire-net pen (1.0×1.83 m), 4 nest boxes (0.37×0.23 m) with different nesting materials were placed at random. The nest boxes were opened 3 d before the expected parturition. Fifty-nine per cent of does kindled in nest box with pure materials (Lignocel®: 50%, straw: 4.5%, hay: 4.5%); however, 41% of does mixed them: does carried Lignocel® (13.6%) or Lignocel® and hay (13.6%) into the nest box bedded with straw, Lignocel (4.5%) or Lignocel and straw (4.5%) into the nest box bedded with wood shavings, and hay and straw (4.5%) into the nest box bedded with

Lignocel®. It can be concluded that rabbit does preferred kindling in the nest box bedded with Lignocel® and most of them refused the nest boxes with wood shavings.

AGGRESSIVE BEHAVIOUR OF GROUP-HOUSED RABBIT BUCK AND DOES AFTER ESTABLISHING THE GROUP

Mikó A.*, SZENDRŐ Zs.*†, ODERMATT M.†, GERENCSÉR Zs.*, RADNAI I.*, NAGY I.*, MATICS Zs.*

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, Kaposvár, Hungary.

†Olivia Ltd, 94 Mizse; 6050 Lajosmizse, Hungary.

miko.annamaria@ke.hu

The aim of the experiment was to observe the aggressive behaviour of buck and does in a group-housing system. The does were housed according to the recommendation of an animal protection group, called Four Paws. Four does (one of them was older than the others) and one buck were placed to a pen with a basic area of 7.7 m². Within the pen, one part of the floor (2.8×1.5 m) was covered with straw and the other part consisted of plastic mesh. The room was illuminated by natural light through the windows, which was extended artificially to reach 16 h light. Using an infrared camera, 24-h recordings were performed throughout the experiment. The aggressive behaviour (fights) of 4 does and a buck was observed during the month after the group was established. The rabbits were marked with different spots to identify them within the group. Most fights were counted on the 1st and 5th d (11 and 14 times). Most attacks were observed before (between 20 and 21 h) and after the dark periods (especially between 6 and 7 h; 13 and 24 times, respectively). A few fights were also observed around noon and midnight. The oldest doe attacked the younger females the most times (59, 30 and 3 times, the does in 2nd, 3rd and 4th position in the ranking, respectively) but 4 times even the buck was attacked. The other rabbit does initiated attacks 16 times in total. Aggressive behaviour is a general problem in group-housing systems.

SEXUAL BEHAVIOUR OF GROUP-HOUSED RABBIT BUCK AND DOES AFTER ESTABLISHING THE GROUP

Mikó A.*, SZENDRŐ Zs.*†, ODERMATT M.†, GERENCSÉR Zs.*, RADNAI I.*, NAGY I.*, MATICS Zs.*

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, Kaposvár, Hungary.

†Olivia Ltd, 94 Mizse; 6050 Lajosmizse, Hungary.

miko.annamaria@ke.hu

The aim of the experiment was to observe the mating behaviour of buck and does in a group-housing system.

The material and methods were similar to the previous summary (Mikó *et al.*) Using an infrared camera, 24-h recordings were performed throughout the experiment. The mating behaviour of 4 does and a buck was observed during the month after the group was established (sexual behaviour among does was also observed). The rabbits were marked with different spots to identify them within the group. The buck attempted mating with does 56 times in total. It was successful (doe accepted the buck) only 11 times at the 1st and the 19th d of the observed month, (6 and 5 times, respectively). The male mated with does most often between 10 and 11 h. Mating behaviour between does reached its maximum at 10 h and 15 h (11 and 21 times, respectively). In the first 4 d of the experiment, rabbit does attempted “to mate” with each other (60 times at the first and 1, 3, 1 times on the following days).

EFFECT OF CAGE TYPE ON PRODUCTIVE AND CARCASS TRAITS OF GROWING RABBITS

GERENCSÉR Zs.*, ODERMATT M.†, ATKÁRI T.†, SAVANYÓ Zs.*, RADNAI I.*, MATICS Zs.*, KASZA R.*, SZENDRŐ Zs.*†

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, Kaposvár, Hungary. †Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

gerencser.zsolt@ke.hu

The aim of the experiment was to compare the productive and carcass traits of growing rabbits housed in different cages. Weaned rabbits at 5 wk of age were randomly divided into 3 groups: small cage (0.19 m², 3 full sibs/cage, [SC], n=90), cage with wire-mesh platform (0.39 m², 6 full sibs/cage, [WPC], n=132), cage with plastic-mesh platform (0.54 m², 8 full sibs/cage, [PPC], n=152). Productive performance was examined between 5 and 10 wk and rabbits were slaughtered at 12 wk. Significant differences were found in weight gain between groups WPC and SC or PPC (37.9, 41.2 and 39.8 g/d, respectively), in body weight at 10 wk between WPC and SC groups (2335 and 2449 g, respectively), and in feed intake between WPC and SC groups (110 and 128 g/d, respectively). No differences were found in feed conversion ratio and dressing out percentage. Ratio of hind part to reference carcass was larger in WPC and PPC than in SC group (36.7, 37.1 and 35.9%, respectively) and the ratio of fat depots to reference carcass was larger in SC than in WPC and PPC groups (2.93, 2.16 and 2.11%, respectively). It can be concluded that the best results were achieved in SC, and the worst performance in WPC group.

EFFECT OF FLOOR TYPE ON THE PRODUCTIVE, CARCASS AND MEAT QUALITY TRAITS OF GROWING RABBITS

GERENCSÉR Zs.*¹, SZENDRŐ K.†², ODERMATT M.‡³, RADNAI I.*⁴, MATICS Zs.*⁵, DAL BOSCO A.#⁶, SZENDRŐ Zs.*⁷

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary.

†Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. ‡Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary;

gerencser.zsolt@ke.hu

The aim of the experiment was to compare the production, carcass and meat quality traits of Pannon Ka (maternal line) growing rabbits housed on different floor types. At the age of 35 d, the rabbits (n=126) were randomly sorted into 3 groups and housed in 9 pens with a basic area of 1.27 m² each. The floor type of the pens was plastic-mesh (PM), deep-litter (DL) or wire-mesh (WM). Body weight, feed intake, mortality, carcass and its parts, pH and colour of meat were measured. The 7 and 10 wk-old PM and WM rabbits' body weight was significantly higher compared to the DL group. At the age of 11 wk, significant differences were only found between the PM and DL groups. No significant differences were found in weight of 12-wk old rabbits, mortality, feed consumption and feed conversion ratio. Significant differences were recorded between the PM and DL groups for the average daily weight gain, dressing out percentage, b* value and ratio of the hind part to the reference carcass. It was concluded that housing growing rabbits on wire- or plastic-mesh floors had no substantial differences, while rearing rabbits on deep-litter had negative effects on some traits, although the alterations were smaller compared to the results in the relevant literature.

EXAMINATION OF PREFERENCE OF GROWING RABBITS AMONG DIFFERENT FLOOR TYPES DEPENDING ON THE ROOM TEMPERATURE

GERENCSÉR Zs.*¹, SZENDRŐ K.†², ODERMATT M.‡³, VARSÁNYI N.*⁴, RADNAI I.*⁵, MATICS Zs.*⁶, SZENDRŐ Zs.*⁷

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary.

†Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. ‡Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

gerencser.zsolt@ke.hu

The aim of the experiment was to examine the location preference of growing rabbits among 3 floor types (plastic-mesh, wire-mesh and deep-litter), depending on the temperature (low, medium and high). At the age of 5 wk, the rabbits were randomly placed into 3 pens each with a basic area of 3.8 m² (43 rabbits/pen, 11.3 rabbits/m²). The

floor of the pens was partly wire-mesh (1/3), plastic-mesh (1/3) and deep-litter (1/3). With infrared cameras, 24 h video recordings were made once a week, between 5 and 11 wk of age. The number of rabbits in each location in the pens was recorded at every 30 min. The treatment was repeated in winter, spring and summer with the following temperature in the room: 10-11°C (low, n=129), 17-20°C (medium, n=129) or 22-26°C (high, n=129). The rabbits showed the lowest preference (7.3-11.6%) for deep-litter ($P<0.001$) at each age, regardless of the temperature. The preference for wire-mesh (24.8-44.7%) and plastic-mesh floor (46.6-63.5%) depended on the temperature. At lower temperature most rabbits preferred staying on plastic-mesh, although at medium and higher temperature more rabbits chose the wire-mesh floor during the final period of fattening.

PRODUCTION, CARCASS AND MEAT QUALITY TRAITS OF GROWING RABBITS IN PEN WITH MULTILEVEL PLATFORMS MADE OF DIFFERENT MATERIALS

FARKAS P.*¹, DAL BOSCO A.†², SZENDRŐ Zs.*³, FILIOU E.‡⁴, MATICS Zs.*⁵, ODERMATT M.#⁶, RADNAI I.*⁷, GERENCSÉR Zs.*⁸

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary.

†University of Perugia, Borgo XX Giugno 74, 06100 PERUGIA, Italy. ‡University of Padova, Agripolis, Viale dell'Università 16, 35020 LEGNARO (PD), Italy. §Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

farkas.peter@ke.hu

The experiment was conducted at Kaposvár University, using the maternal line (Pannon Ka) of the Pannon Breeding Program. A total of 174 rabbits of both sexes, weaned at 5 wk of age were studied for 6 wk. They were randomly divided into 3 groups: 2 pens without platform, 2 pens with 2-level wire-mesh elevated platforms, 2 pens with 2-level plastic-mesh elevated platforms. The size of each pen was 1.0×1.83 m (29 rabbits/pen, 16 rabbits/m² calculated for bottom level or 9.14 rabbits/m² calculated with the surface of floor and platforms). Body weight, weight gain, feed intake, feed conversion ratio, morbidity and mortality were not significantly different among the groups. No significant difference in any of carcass and meat quality traits was noticed among the 3 groups. It can be concluded that the enriched pens, greater possibilities for movement and lower stocking density did not influence the production of growing rabbits, although they could improve animal welfare.

LOCATION CHOICE OF GROWING RABBITS IN PENS WITH WIRE-MESH OR PLASTIC-MESH MULTILEVEL PLATFORMS

FARKAS P.*, SZENDRŐ Zs.*[‡], FILIOU E.[†], MATICS Zs.*[‡], ODERMATT M.[‡], DAL BOSCO A.[#], GERENCSÉR Zs.*

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary.

[†]University of Perugia, Borgo XX Giugno 74, 06100 PERUGIA, Italy. [‡]University of Padova, Agripolis, Viale dell'Università 16, 35020 LEGNARO (PD), Italy. [#]Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

farkas.peter@ke.hu

The experiment was conducted at Kaposvár University. A total of 116 rabbits of both sexes, weaned at 5 wk of age, were studied. They were randomly divided into 2 groups, and distributed into 6 same-size wire-net pens (1.0×1.83 m, 16 rabbits/m², calculated for bottom level). The pens were different in the type of platforms. Groups of 29 rabbits per pen (2 pens per treatment) were formed: 2 pens were equipped with 7 wire-net elevated platforms and 2 pens with the same number of plastic-mesh elevated platforms, placed at 2 different heights. The 24-h video recordings were achieved using infrared cameras. Between the ages of 5 and 11 wk, the position of the rabbits was evaluated once a week; the number of rabbits on the bottom level (under the platforms or in front of the platform) and on each of the platforms were registered every half hour, and space utilisation density was calculated as rabbits/m² in each location. The space utilisation density was higher on the floor compared to the platforms (in pen with wire-mesh platform: 11.9 vs. 5.4, plastic-mesh platform: 10.3 vs. 7.24 rabbits/m², respectively). The rabbits chose the plastic-mesh platform more frequently (the stocking density was 1.3 times higher on plastic-mesh than on wire-mesh platform), and the 2nd level (the stocking density was: 2.6 and 1.6 times higher on the 2nd than on the 1st floor in pens with wire-mesh and plastic-mesh platform, respectively). This can be explained by the fact that the rabbits on the platform may urinate on the 1st floor and under the platform and this is why the highest stocking density was observed on the bottom floor in front of the platforms. The majority of growing rabbits stayed under the platform most often in their resting period between 11:00 a.m. and 05:00 p.m., so the lowest number of rabbits was on the platform at this time, and furthermore they also relaxed. The space utilisation density was lower in front of the platform at the resting period (between 11:00 a.m. and 05:00 p.m. in pen with wire-mesh platform: 14.2, plastic-mesh platform: 11.9 rabbits/m²) than between 05:00 p.m. and 11:00 p.m. (in pen with wire-mesh platform: 15.9, plastic-mesh platform: 14.5 rabbits/m²), or 11:00 p.m. and 05:00 a.m. (in pen with wire-mesh platform: 20.5, plastic-mesh platform: 18.0 rabbits/m²). Moreover, more rabbits chose the plastic-mesh platform in preference to the wire-mesh platform at all times of day.

EFFECT OF GENOTYPE (PANNON LARGE AND HUNGARIAN GIANT) ON PRODUCTIVE AND CARCASS TRAITS OF GROWING RABBITS

SZENDRŐ K.*[‡], SZENDRŐ Zs.^{†#}, MATICS Zs.[†], DALLE ZOTTE A.[‡], ODERMATT M.[#], RADNAI I.[†], GERENCSÉR Zs.[†]

*Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. [†]Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. [‡]Department of Animal Medicine, Production and Health, University of Padova, Agripolis, Viale dell'Università 16, 35020 LEGNARO (PD), Italy. [#]Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

szendro.katalin@ke.hu

The aim of the experiment was to examine the effect of genotype on productive performance and carcass traits of growing rabbits to gather information on the value of Pannon Large and Hungarian Giant rabbits. Pannon Large does were inseminated with semen of Pannon Large or Hungarian Giant bucks. The crossbred rabbits (PLarge and HGiant; n=336) were weaned at 5 wk of age. Half of them were housed in cages, the other half in pens. Two subgroups were formed based on the feeding method (pelleted diets without or with hay supplementation; Pellet and P+Hay). Only the effect of genotype was evaluated between 5 and 12 wk. Significant differences were found in body weight from 5 wk of age, in favour of PLarge rabbits. It increased from 72 g at 5 wk to 235 g at 12 wk. Weight gain of PLarge rabbits was higher by 2.8 g/d between 5-12 wk ($P<0.001$) compared to HGiant rabbits. The differences were significant in pellet intake by 15 g/d between 5-12 wk, with higher value in PLarge rabbits. The effect of genotype on feed conversion ratio and mortality was not significant. Dressing out percentage of PLarge rabbits was 1.1-1.3% better than that of HGiant rabbits. Significant differences were found in carcass parts: the ratio of fore part to reference carcass was higher in PLarge group than in HGiant rabbits, and the ratio of hind part to reference carcass was higher in HGiant rabbits than in PLarge group, although no significant difference was found in the mid part of the reference carcass. The ratios of fat deposits were significantly greater in PLarge rabbits than in HGiant animals. It was concluded that Hungarian Giant would be worth rearing as terminal bucks if a higher price were paid to the farmers.

EFFECT OF HOUSING OF GROWING RABBITS IN CAGE OR IN PEN ON PRODUCTIVE AND CARCASS TRAITS

SZENDRŐ K.*[‡], SZENDRŐ Zs.^{†#}, MATICS Zs.[†], DALLE ZOTTE A.[‡], ODERMATT M.[#], RADNAI I.[†], GERENCSÉR Zs.[†]

*Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. [†]Faculty of Agricultural and

Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. [‡]Department of Animal Medicine, Production and Health, University of Padova, Agripolis, Viale dell'Università 16, 35020 LEGNARO (PD), Italy. ^{*}Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

szendro.katalin@ke.hu

The aim of the experiment was to examine the effect of housing condition on productive performance and carcass traits, to gather information on the difference between cage and pen housed growing rabbits. The genotypes, housing and feeding conditions were the same as in the previous experiment (Szendró *et al.*). Only the effect of housing (between 5 and 12 wk) was evaluated. The differences in body weight between Cage and Pen rabbits were significant from 7 wk of age, in favour of the Cage group. It increased from 96 g at 7 wk to 141 g at 12 wk. The differences in weight gain were significant between 5-12 wk (3.1 g/d), in favour of Cage rabbits. There were no significant differences in pellet intake, feed conversion ratio or mortality. The housing condition did not affect the dressing out percentage, but the ratio of ear lesions was significantly different (0 and 34%; $P < 0.001$, in cage and pen, respectively). The ratios of fore- and hind parts to reference carcass were higher in Pen rabbits, and that of mid part, perirenal- and scapular fat were higher in Cage rabbits. In pens the rabbits could move more, so their weight gain and body weight were lower, but the ratio of fore and hind parts were higher. It can be concluded that housing growing rabbits in pen (larger group) resulted in lower body weight and a longer fattening period to reach the same weight. Moreover, housing of rabbits in a large group negatively affected their welfare, due to the higher incidence of ear lesions.

EFFECT OF FEEDING (ONLY PELLETED DIET OR PELLET PLUS HAY) ON PRODUCTIVE AND CARCASS TRAITS OF GROWING RABBITS

SZENDRÓ K.*, SZENDRÓ Zs.^{†,‡}, MATICS Zs.[†], DALLE ZOTTE A.[‡], ODERMATT M.[#], RADNAI I.[†], GERENCSEY Zs.[†]

^{*}Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. [†]Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. [‡]Department of Animal Medicine, Production and Health, University of Padova, Agripolis, Viale dell'Università 16, 35020 LEGNARO (PD), Italy. ^{*}Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

szendro.katalin@ke.hu

The aim of the experiment was to examine the effect of feeding on productive performance and carcass traits, to gather information about the difference between growing rabbits fed by only pelleted diet or pellet plus hay. The genotypes, housing and feeding conditions were the same as in the previous experiment (Szendró *et al.*). Data (between

5 and 12 wk) were evaluated by multi-factor analysis of variance, but only the effect of feeding was calculated. The differences in body weight between Pellet and P+Hay rabbits were significant from 9 wk of age, in favour of the Pellet group. The differences in weight gain and feed intake were significant between 5-12 wk (11 g/d and 1.3 g/d, respectively), in favour of Pellet rabbits. However, there were no significant differences in feed conversion ratio and mortality. The dressing out percentage was higher by 0.4-0.7% in the Pellet group than in P+Hay rabbits. The ratio of hind part to reference carcass was higher in the P+Hay group, and those of perirenal- and scapular fat were higher in the Pellet group. Hay supplementation did not influence the ratio of fore- and mid-parts compared to the reference carcass. However, the ratio of ear lesions was affected by hay supplementation (8.3 and 20.6%; $P = 0.003$, in Pellet and P+Hay, respectively). It can be concluded that feeding growing rabbits with pellet plus hay resulted in significantly, but slightly lower body weight and a longer fattening period to reach the same weight. On the other hand, animals fed by pellet plus hay presented fewer ear lesions.

EFFECT OF GENOTYPE, HOUSING AND FEEDING ON PRODUCTIVE AND CARCASS TRAITS OF GROWING RABBITS

SZENDRÓ K.*, SZENDRÓ Zs.^{†,‡}, MATICS Zs.[†], DALLE ZOTTE A.[‡], ODERMATT M.[#], RADNAI I.[†], GERENCSEY Zs.[†]

^{*} Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. [†] Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. [‡]Department of Animal Medicine, Production and Health, University of Padova, Agripolis, Viale dell'Università 16, 35020 LEGNARO (PD), Italy. ^{*}Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

szendro.katalin@ke.hu

The aim of the experiment was to examine the combined effect of genotype, housing condition and hay supplementation on productive performance and carcass traits of growing rabbits, to obtain information on the differences among the different combinations of treatments. The genotypes, housing and feeding conditions were the same as in the previous experiment (Szendró *et al.*). Data between 5 and 12 wk were evaluated. A clear tendency in weight gain, body weight at 12 wk and dressing out percentage can be detected in groups of PLarge rabbits: Cage-Pellet>Cage-Pellet+Hay>Pen-Pellet>Pen-Pellet+Hay, although in HGiant rabbits only the Cage-Pellet rabbits differed from the other 3 groups. The ratio of perirenal- and scapular fat showed similar tendencies in both genotypes. Between groups Cage-Pellet and Pen-Pellet+Hay, the ratios of hind and fore part to reference carcass showed increasing

tendency, while that of mid part decreased. The highest ratios of ear lesions were observed in groups of HGiant-Pen-Pellet (55.3%) and PLarge-Pen-Pellet (50%), followed by PLarge-Pen-Pellet+hay (31.7%), although in the other groups no lesions occurred.

EFFECT OF GENOTYPE, HOUSING CONDITION AND FEEDING METHOD ON ECONOMICS OF RABBIT MEAT PRODUCTION

SZENDRŐ K.*, SZENDRŐ Zs.†#, MATICS Zs.†, ODERMATT M.#, RADNAI I.†, GERENCSÉR Zs.†

*Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. †Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. ‡Olivia Ltd, 94 Mizse; 6050 LAJOSMIZSE, Hungary.

szendro.katalin@ke.hu

The aim of the experiment was to examine the effect of genotype, housing condition and feeding method on economics, to gather information about the value of Pannon Large and Hungarian Giant rabbits, housed in cages or pens, and fed by pellet or pellet plus hay. The genotypes, housing and feeding conditions were the same as in the previous experiment (Szendrő *et al.*). The first cost factor was the price of weaned rabbit (weight×price of weaned rabbit=1.83 Euro/kg). Cost of production was based on feeding cost (80% of production cost) and the cost of mortality. Cost analysis was carried out based on the average cost of feed (0.275 Euro/kg) and 10% lower and higher price as well (low, medium=med, high price in Euro). Mortality cost, as a loss of revenue, was considered as the price of weaned rabbit and the cost of feed consumed till death. In addition, gross profit, cost to revenue and profit to cost ratios were calculated. Significant differences were found in gross profit and profitability ratios; comparing all groups (out of the 24 combinations) only Cage-Pellet, Cage-Pellet+Hay, Pen-Pellet+Hay of PLarge, and Pen-Pellet of HGiant rabbits exceeded the average values within profitability indicators. The results of the separated effects showed that PLarge rabbits kept in cages and fed by pellet only realised higher gross profit and better profitability ratios compared to HGiant rabbits, Caged rabbits and those fed by Pellet+Hay. The conclusion was that the Hungarian Giant genotype (as terminal bucks), pen housing and pellet plus hay feeding were worth using only if a higher price was paid for the rabbits to the farmers. However, hay supplementation had a positive effect on mortality.

COMPARISON OF THREE GENOTYPES SELECTED FOR DIFFERENT CRITERIA, SLAUGHTERED AT SIMILAR WEIGHT

SZENDRŐ K.*, SZENDRŐ Zs.†, MATICS Zs.†, RADNAI I.†, KASZA R.†, GERENCSÉR Zs.†

*Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary. †Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary.

szendro.katalin@ke.hu

The aim of the experiment was to compare 3 genotypes, slaughtered at similar weight, to examine their productive and carcass traits. Pannon Ka (PKa): maternal line, selected for litter size, adult weight (AW): 4.0-4.5 kg, Pannon White (PWhite): selected for litter weight at 3 wk (former for growth rate) and volume of muscle on hind legs (VML), AW: 4.3-4.8 kg, Pannon Large (PLarge): selected for growth rate and VML measured by computer tomography (CT), AW: 4.8-5.4 kg. PKa does were inseminated with semen originating from PKa, PWhite or PLarge bucks. Crossbred kits (PKa×PKa, PKa×PWhite, PKa×PLarge) were weaned at 35 d of age and reared until 88, 83 and 79 d, respectively, when they reached similar average weight (2785-2795 g). The weight gain of PKa×PKa, PKa×PWhite and PKa×PLarge were 35.6, 39.2 and 42.8 g/d, respectively ($P<0.001$). Daily feed intake of PKa×PLarge rabbits was significantly higher than that of PKa×PKa and PKa×PWhite rabbits. Significant differences were found in feed conversion ratio between weaning and the end of the fattening period, with the best result in PKa×PLarge and the worst in PKa×PKa group. Mortality was low, and independent from genotypes. Significant differences were found in dressing out percentage (59.2, 60.1 and 59.6%) and in ratio of hind part to reference carcass (36.6, 37.7 and 37.5%) in PKa×PKa, PKa×PWhite and PKa×PLarge, respectively. According to the literature, breeds which grow faster are slaughtered at a younger age, but they are not in the same stage of maturity. This is why the breeds with a smaller AW had higher maturity at slaughter, and had better dressing out percentage, lower ratio of the fore part, and higher ratio of the hind part compared to large bodied breeds and lines. However, the results of the present experiment provided new evidence to support this statement, as the genotypes, which were selected for carcass traits by CT for shorter or longer periods, achieved better results in carcass traits than the maternal line when comparing them at the same weight.

CORRELATION ANALYSIS OF THE FAT DEPOTS OF GROWING RABBITS

CZÁKÓ B., DONKÓ T., RADNAI I., MATICS Zs., GERENCSÉR Zs., NAGYNÉ KISZLINGER H., NAGY I., SZENDRŐ Zs.

Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary.

czako.bernadett@ke.hu

Computer tomography (CT) and test slaughter results of 178 Pannon White rabbits were analysed. The rabbits were reared at the rabbit farm of Kaposvár University. Rabbits were slaughtered at 11 wk of age at the body weight of 2.2-3.5 kg. The main traits considered in the analysis were as follows: CT-based total body fat volume (TBFVo), CT-based hind leg fat volume (HLFVo), perirenal fat weight (PerFW) and scapular fat weight (ScapFW) (based on test slaughter). Phenotypic correlation coefficients estimated between the slaughter traits and TBFVo, HLFVo and TBFVo-HLFVo were 0.66, 0.65 and 0.56, 0.58, respectively. Taking into account the hot carcass weight, it appreciably modified the results. The partial correlation coefficients were lower: between the PerFW and TBFVo was 0.49, between PerFW and HLFVo was 0.56, between ScapFW and TBFVo was 0.37, between ScapFW and HLFVo was 0.31, between PerFW and TBFVo-HLFVo was 0.49, and between ScapFW and TBFVo-HLFVo was 0.36.

increase of the does' inbreeding coefficient resulted in 0.042-0.046 kg lower litter weight based on the 1st and 3rd models, but practically no inbreeding depression was found using models 2 and 4. Based on our results, we may conclude that the models containing number of reared kits performed better compared to the models not including this effect. The authors also consider that including dominance effect is advantageous in terms of precision when estimating breeding values.

ESTIMATING DOMINANCE EFFECTS AND INBREEDING DEPRESSION OF LITTER WEIGHT AT DAY 21 IN PANNON WHITE RABBITS

NAGY I.*, FARKAS J.†, GYOVAI P.*, SZENDRŐ ZS.*

*Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary.

†Faculty of Economic Science, Kaposvár University, 40, Guba S. str., H-7400, KAPOSVÁR, Hungary.

nagy.istvan@ke.hu

Genetic parameters and inbreeding depression were estimated for litter weight at day 21 of the synthetic Pannon White rabbit population (selected as a closed population at the Experimental Rabbit Farm of the Kaposvár University, Hungary, since 1992). The data file contained 16533 kindling records of 4066 rabbit does for the 1992-2012 period. The total number of animals in the pedigree file was 4913. Residual maximum likelihood procedure was applied using 4 different single trait repeatability animal model (using VCE 6). All models contained year and month of measurement as fixed effect, individual inbreeding coefficients and complete pedigree equivalents of the rabbit does as covariates, and animal and permanent environmental effects as random effects. The 3rd and 4th model contained dominance effect, while the 2nd and 4th model also contained number of reared kits (at day 21) as covariates. The estimated heritability for litter weight was low for all models and ranged between 0.05 ± 0.01 and 0.07 ± 0.01 . The estimated permanent environmental effects showed higher relative importance compared to the additive genetic effects and their value varied between 0.11 ± 0.02 and 0.20 ± 0.01 . The magnitude of dominance effect was moderately low for models 3 (0.20 ± 0.01) and 4 (0.26 ± 0.01). Analysing the inbreeding depression, 10%