

Abstracts of the papers presented during the

15th HUNGARIAN CONFERENCE ON RABBIT PRODUCTION

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PRODUCTION

CURRENT SITUATION AND POSSIBILITIES OF DEVELOPMENT IN THE RABBIT PRODUCTION SECTOR

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After a decline lasting for several years, in 2001 the quantity of rabbits sold alive (12,761 tons) and the export volume of slaughtered rabbits (5,615 tons of carcass) increased, however it declined by 7% in 2002 (11,887 and 5,388 tons). Further changes took place in the production structure. In addition to the approx. 20,000-doe farms owned by two slaughterhouses, the number of farms with more than 200 does increased. The production conditions of these large farms fully conform to the EU requirements. Small farms can become viable if they form integrated production systems. In the year 2002, three rabbit slaughterhouses were in operation, with utilisation rates varying between 35 and 92%. The ratio of partial and whole carcass products was 58 and 42% in 2001 and 42 and 58% in 2002, of total exports. Italy continued to be

the biggest importer (52%) , followed by Switzerland (26%), Germany (16%), Belgium (3%), France (1%) and Russia (1%). Domestic consumption of rabbit meat continues to be negligible: although total home consumption rose, only about 3-5% of the processed rabbits were sold on the domestic market.

CONSUMERS OPINION ABOUT RABBIT MEAT CONSUMPTION IN HUNGARY

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The aim of the study was to get information about the rabbit meat consumption habits of Hungarian consumers. Information was collected by questionnaires (n=731). Rabbit breeders have regular local clients, and consumers buy from them living animals (42%) and also carcasses (31%) at the local markets. 70% of the consumers buy rabbit from farmers. A lot of people (54%) have a negative attitude to rabbit meat. Most of them have never tasted it (23%), have an aversion to it (20%) or do not like it (12%). A frequent problem is the lack of rabbit meat and

rabbit products in the supermarkets (21%). The culture of rabbit meat processing and cooking is very poor in the Hungarian cuisine. Only 7% of the people could list more than 2 rabbit recipes. The price of the meat is reasonable (50%) or cheap (4%). 53% need more meat or products "ready for cooking" and 27% ask for a price reduction in the shops. Marketing can only be ineffective in the vegetarian group.

GENETICS

PRODUCTION OF RABBIT CHIMERAS BY INJECTION METHOD

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Producing chimeras is an important method of creating animals from stem cells. To produce ES origin rabbits, in this experiment we studied the efficiency of creating chimeras by injecting a donor cell into a precompacted 8-16 cell stage embryo by micromanipulation. The donor cells were obtained from transgenic precompacted embryos. After the micromanipulation the embryos were transferred into recipient females. Chimeric offspring were identified by a transgene specific PCR in DNA samples isolated from different tissues. From the 87 transferred, micromanipulated embryos, 27 offsprings were born. According to the result of transgene detection, four of them were chimeric. The chromosome analysis of the adult chimera rabbits revealed that two were

XX/XX females, one XY/XY male and one XX/XY hermaphrodite.

CHROMOSOMAL SEX OF LYMPHOCYTES OF CHIMERIC RABBITS

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Four chimeric rabbits (one normal male, one hypogonadic, but fertile male and two females) were produced by injecting single embryonic cells into morulas. According to chromosome investigations of peripheral blood lymphocytes the two females had XX, the normal male XY cells, and the hypogonadic male was an XX/XY chimera.

PHYSIOLOGY

EXAMINATION OF THE GLUTATHIONE REDOX SYSTEM DURING LACTATION AND SUCKLING PERIOD IN RABBITS

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Oxygen free radicals are continuously produced in physiological and pathological

processes of animals. An effective antioxidant defence system, the glutathione redox system including glutathione peroxidase has developed to eliminate these reactive oxygen species. Probable physiological processes accompanied by physiological oxidative stress are pregnancy, lactation, birth and early postnatal life. In the experiment presented, oxidative effects during lactation and suckling period were studied in New Zealand White lactating does and their pups. Glutathione peroxidase activity was measured in blood plasma, red blood cell haemolysate, liver, lung, muscle and kidney samples. Our results show that both lactation and the first 4 weeks of postnatal development are accompanied by oxidative processes. This is obvious from the changes of glutathione peroxidase activity during the experiment.

SERUM METABOLITES AND ENZYMES IN REGULARLY TRAINED GROWING RABBITS

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Pannon White male rabbits (2x8) were divided into two groups after weaning. Treated rabbits (n=8) were exposed to treadmill running two times a day while control (n=8) were not, for a trial period of 4 weeks. Blood samples were taken every week from the left ear vein, for serum metabolite and enzyme measurements. Serum albumin, total protein and creatinine concentrations were higher during the second part of the trial, while triacylglycerol was higher in weeks 1 and 4,

in the treated group. Resting serum NEFA was lower in this group at the end of the trial, as was basal total lactate dehydrogenase activity. In serum urea, total and HDL-cholesterol no differences were found, furthermore, serum alanine aminotransferase, aspartate aminotransferase and γ -glutamyl transpeptidase activities were also not changed, while creatine kinase activity was slightly lowered in the trained group. The serum cortisol concentration was not different in the trained and control rabbits.

HOUSING AND BEHAVIOUR

MINIMAL HUMAN CONTACT IS SUFFICIENT TO ELIMINATE FEAR REACTIONS IN WEANLING RABBITS

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Earlier it was found that handling during nursing specifically reduces rabbits' fear responses toward humans. In the present experiment we investigated whether even minimal human contact can reduce avoidance. Newborn New Zealand White rabbit pups were handled in the first week of their life. The pups were exposed to (1) full handling not more than half an hour after nursing (FH<0.5h), which consisted of removing the pups from the nest and weighing them (about 5 min/litter); (2) full handling more than two hours after nursing (FH>2h), the treatment was similar to the previous; (3) routine checking not more than half an hour after nursing

(RC<0.5h), consisting of touching the pups during a daily routine check by the stockpersons to see whether all pups were alive (about 5 sec/litter); (4) routine check more than two hours after nursing (RC>2h), which involved the same treatment. At 28 days of age timidity was measured in a 5 min approach test, when the latency of the first approach and the total numbers of them were recorded. Pups handled within half an hour after nursing became tamer than those handled later, irrespectively of the length of the handling. It was concluded that even minimal human contact linked to nursing is effective in reducing avoidance.

EFFECT OF FREQUENT WEIGHING ON THE PERFORMANCE OF GROWING RABBITS

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Rabbits were weaned at 21 (n=108) or at 35 days of age (n=108). Both groups were divided into two subgroups. One of them was weighed weekly (frequently) and the other only at the beginning and at the end of the experiment (control). There was no significant difference between the frequently weighed and the control group in body weight, feed intake and feed conversion. The difference in mortality may be independent of the treatment. Experimental results show that the frequently weighed rabbits reach identical performance with those in the farm practice.

EFFECT OF STOCKING DENSITY ON THE PERFORMANCE OF EARLY WEANED RABBITS

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252 rabbits were nursed by one or two does. Both groups were divided into two subgroups. In the first, 3 rabbits per cage were housed between 21 and 70 days of age (Group 3). In the other group 6 rabbits were housed between 21 and 42 days of age and later only 3/cages were reared until 70 days of age (Group 6/3). The effect of number of nursing does was significant on feed intake (85 or 81 g/days; $P<0.05$) and weight at 70 days of age (2093 or 2005 g; $P<0.05$) for rabbits nursed by two or one does, respectively. The effect of stocking density was significant on kit mortality between day 21 and 70, its value was 36 and 18% for group 3 and group 3/6, respectively. Rearing the rabbits in two phases, 6 rabbits/cage between 21-42 days and 3 kits/cage between 42-70 days of age was found to be economically advantageous since more rabbits were housed in a cage or in a building matched with lower mortality and without any negative influence on the other traits.

EXAMINATION OF FREE CHOICE OF
RABBITS OF DIFFERENT
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Rabbits were placed in a block of 4 cages with total floor-area of 2 m². The animals could move freely among the cages through swing doors. All four cages were totally identical; they only differed in the floor (planked with OSB panel, plastic-slat, plastic-mesh or wire-mesh). Individuals, groups of 24 or 32 rabbits, weaned at 21 days of age were placed in the block. During the experiment (until 10 weeks of age) the free choice of rabbits of the cage-floors was studied weekly by means of 24 hour video recordings. Individually reared rabbits preferred the planked-floor. Between the age of 3.5 and 5.5 weeks, the preference for planked-floor increased from 24% to 56%, while at the age of 9.5 weeks it decreased to 40%. The choice of plastic-mesh floor increased from 19% to 40% between 5.5 and 9.5 weeks of age. The choice of wire-mesh floor fluctuated between 16 and 22%, while the plastic-slat floor was mostly refused. The soiled and wet (by urine) planked-floor was chosen by increasingly fewer group-reared rabbits after the first week. Placing both 24 and 32 rabbits into the block, the plastic-mesh floor was preferred. As they grew older the choice of plastic-mesh, wire-mesh and plastic-slat floor became similar. The increase of both number and weight of rabbits/m² influenced the acceptance of different floors. Rearing 32 rabbits together, the choice of the 3 preferred floor types became similar at 7.5 weeks of age, while rearing 24 rabbits in a group, it became similar only in 9.5 weeks of age. On the basis of the observations the rabbits mostly chose the plastic-mesh floor.

EFFECT OF STOCKING DENSITY,
BEDDING MATERIAL AND FEEDING
ON THE PERFORMANCE OF GROWING
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Rabbits (n = 378) were reared under different conditions. The number of animals per cage (0.8 m²) was 4, 7, 10 or 13. The stocking densities were 5, 8.75, 12.5 or 16.25 rabbits/m², respectively. Deep litter was placed in the cages at the time of weaning, 2 or 4 weeks after weaning or rabbits were reared on wire net until the end of the experiment. One group of rabbits was fed by medicated pellet, while the other with non-medicated pellet with or without hay supplementation. The effect of stocking density was significant on body weight gain from the age of 7 weeks (13 rabbits/cage) or from the 9-10th week (7-10 rabbits/cage), and on the daily feed intake from the age of 8 weeks. The feed conversion ratio was independent of the stocking density. In the week when the rabbits were put on deep litter, the daily weight gain significantly decreased. Concerning the feed intake, it seems that the rabbits also consumed some litter material. This affected both the pellet intake and the feed conversion. The effect of diet on the performance of rabbits was weak. In the group of rabbits fed with non-medicated pellet and hay the feed intake was lower since only the pellet consumption was measured.

EFFECT OF GROUP SIZE ON
PRODUCTION OF GROWING RABBITS
ON DEEP LITTER

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The production of growing rabbits in 4 experimental and 2 control groups was compared. 8, 16, 32 and 64 weaned (35 days old) rabbits were housed in pens of 0.8, 1.6, 3.2 and 6.4 m² size (10 rabbits/m² in each), on deep litter (DL8, DL16, DL32, DL64, n = 64 each). One of the control groups (64 animals) was reared in a pen of 6.4m² size, on wire net (WN64). All these rabbits were fed with non-medicated pellet with oat and hay supplementation. The other control group (n=64) was housed in wire net cages (3 rabbits/0.2m²) and fed with medicated pellet (INT3). The effect of group size was not significant but the weight gain and the weight (LW) of rabbits tended to decrease (DL8→DL32) in the larger groups except DL64. The WG and LW of group DN64 was slightly higher than in the DL64 group but the rabbits in INT3 group had significantly higher WG and LW (with about 25 and 10% resp.), than in the DL groups. The mortality of rabbits in group DL32 was the highest (20.3%) and that of group INT3 was the lowest (0%). The group size (DL8→DL64) had no significant effect on slaughter traits but the dressing out percentage (DP) was different between groups DL64 and WN64 (54.9 and 56.2%, resp.). The ratio of fore-, intermediate- and hind parts (FP, MP, HP) to the live weight was also higher in group WN64. The most

remarkable differences were between groups of DL and INT3 (DP:54.7 and 58.9%, FP: 12.4 and 13.5%, MP: 14.7 and 16.6%, HP: 17.9 and 18.9%, resp.). The fat content was 0.47, 0.70 and 0.96% in groups of DL, WN64 and INT3, respectively.

EXAMINATION OF FACTORS
INFLUENCING THE SURVIVAL OF
RABBITS

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732 newborn rabbits were divided into 3 groups according to their birth weight (low: 35-45g, medium: 53-55g, high: 65-70g). Kits of each group were nursed by one or two does, in equal proportions. After weaning at 21 days of age all groups were halved and they were fed either *ad libitum* or restricted. In the restricted group, the rabbits' food consumption was limited to 10, 9, 8, 7 and 6 hours between the age of 4-6, 6-9, 9-12, 12-15 and 15-18 weeks, respectively. All of the 12 groups were divided again and the does were inseminated first at either 15.5 or 18.5 weeks of age. The effect of birth weight on survival was significant between the age of 0-21 (cumulative survival of low, medium and high birth weight group was 79.6, 83.7 and 86.6%, resp.) and 22-105 days (cumulative survival was 81.8, 88.6 and 90.4%, resp.) but its influence ceased after the first mating. The effect of number of nursing does was not significant on survival of the suckling and growing rabbits but the survival rate of does after 100 days in production tended to be different ($P = 0.13$). The effect of feeding scheme was not significant on the survival of rabbits between the age 22-105 days and on does. The survival of does was independent of the age at first mating.

NUTRITION

DIGESTIVE PHYSIOLOGICAL INVESTIGATIONS IN EARLY WEANED (AT DAY 21) RABBITS

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In order to get more information about the physiological changes in the gastrointestinal (GI) tract around weaning, the effect of early weaning (at day 21) was examined in rabbits fed antibiotic-free experimental diet. Body weight gain, growth of different organs and the GI tract, weight and pH of the gastric and caecal content, composition of the caecal microflora, VFA content were measured and compared to rabbits fed the same diet but supplemented with 'in-feed' antibiotics. It could be concluded that early weaning can be carried out without an increase in losses when animals are fed a diet of high quality and appropriate nutrient content. Changes in certain parameters (pH, microflora, VFA content) due to early weaning were temporary and non significant, and they did not lead to the development of enteropathy.

DOSE-RESPONSE OF DIETARY CELLULASE ENZYME INCLUSION ON THE PERFORMANCE OF FATTENING RABBITS

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One hundred twenty NZW rabbits were weaned at 23 days of age and the littermates were divided into four homogeneous experimental groups with respect to litter size and individual weight (510-516 g) at weaning. The rabbits received a cellulase-hemicellulase enzyme complex supplemented diet of high, moderate or low levels (enzyme activities were 5280, 3520 and 1199 FPU/kg diet, respectively which corresponded to 75%, 50% and 17% of our earlier applied dose of 7040 FPU/kg) *ad libitum*, while a commercial unmedicated pellet of similar composition but without enzyme addition was freely available for the control animals. After 9 weeks of age each group was fed the same untreated control diet. The weanlings were individually housed in wire net fattening cages under controlled indoor conditions. It was concluded that it is recommendable to supplement the diet of early-weaned rabbits with a cellulase-hemicellulase complex reaching 5280-7040 FPU/100 kg enzyme activity. Namely, due to the better ($P < 0,04$) feed efficiency between 3-11 weeks of age (2.97, 2.91, 3.04 and 3.03 for the 75%, 50%, 17% and 0% administration, respectively) both the 3-11 weeks daily weight gain (43.9, 43.5, 42.6 and

43.1 g/d, resp.) and the weight at 11 weeks of age (2964, 2944, 2905 and 2932 g, resp.) tended to improve. Considering also animal well-being, another benefit was the significant ($P<0,05$) decrease in mortality possibly caused by enteritis (3, 13, 13 and 20%, respectively) during fattening.

EFFECT OF DIETARY ADDITION OF ANISEED AND FENUGREEK SEED ON THE PERFORMANCE IN DOE RABBITS

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The objective of the experiment was to study the effect of 6-6 g/kg dietary addition of whole aniseed (*Pimpinella anisum*) and fenugreek seed (*Trigonellae foenum-graeum*) on the production of NZW doe rabbits. Thirty eight animals were divided into two groups (19 each). In the control group (C) a commercial pelleted diet (17.5% crude protein, 13.9% crude fibre, 3.1% crude fat, 10.3 MJ/kg DE) while in the experimental group (AF) the same pellet but supplemented with spices was offered from 3 days before kindling until the 17th day of lactation, *ad libitum*. Animals consumed the control diet in both groups afterwards. Daily milk production was measured by the weight-nurse-weight method until day 17. In comparison with C does, the AF mothers had a slightly lower feed intake (325 vs 348 g/d, $P<0.058$) that was

insignificantly better converted to milk (1.59 vs 1.66 g/g) of which the total yield was however by 2.7% lower (3468 g vs 3561 g) between 1-17th day of lactation. Despite the similar daily milk supply of pups (26.7 and 26.4 g/d in AF and C, respectively) in connection with the smaller litter size at 17d (7.68 vs 7.95), the individual weight of AF kits at 17d was insignificantly lower (334 vs 341g) resulting in a poorer milk conversion of AF young as compared to C rabbits (1.73 vs 1.64 g/g, $P<0.011$). Suckling mortality was insignificantly different, 4.6% in AF and 1.3% in C group during the 17 days of nursing. There was no significant difference in 35d litter size (7.65 and 7.89), litter weight (6837 g and 7168 g), individual weaning weight (900 g and 909 g) and 1-35d daily weight gain (23.8 g/d and 24.1 g/d) of AF and C rabbits, respectively. Further studies are needed to determine the optimal dose and proportion of these spices in the diet of lactating rabbits.

GROWTH AND MEAT

THE EFFECT OF DIFFERENT REARING METHODS ON THE WEIGHT OF RABBITS

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The aim of the experiment was to study the effect of the nutrient supply at foetal, suckling and growing age and the effect of the age at first mating on the body weight of rabbits. Newborn rabbits were divided into three groups on the basis of birth weight (low = 34-45 g, medium = 53-58 g, high = 65-70

g). Half of the litters were nursed by one doe and the other half by two does. After weaning at 21 days of age, half of the rabbits were fed *ad libitum* while the other half were fed restricted (about 85-90% of the *ad lib.*). All the 12 groups were divided into two halves randomly: first AI at 15.5 or 18.5 weeks of age. All of the studied factors had significant effects on the body weight of rabbits. At 4 weeks of age the influence of birth weight was the highest (L: 0.51, H: 0.67 kg, $P < 0.05$), but there was a strong difference between groups nursed by one or two does (0.52 and 0.64 kg). At 9 weeks of age the effect of all factors were similar (L: 1.85, H: 2.10 kg, one or two does: 1.89 and 2.05 kg, rest. and *ad lib.*: 1.86 and 2.04 kg). At 15 weeks of age the following differences were found: L: 3.03, H: 3.37 kg, one or two does: 3.11 and 3.26 kg, rest. and *ad lib.*: 3.00 and 3.37 kg. The highest difference was found between the group of low birth weight, nursed by one doe and feed-restricted (2.75 kg) and the group of high birth weight, nursed by two does and fed *ad libitum* (3.81 kg). The effect of birth weight and number of nursing does remained significant after the first mating. Both groups were fed *ad libitum* after first mating. The feed consumption of the feed-restricted group increased remarkably after the first mating, therefore the order of groups interchanged at the first kindling (rest.: 3.80, *ad lib.*: 3.66 kg, $P < 0.05$), and this difference remained until the 4th kindling. The effect of age at first mating was diminished at the first kindling.

EFFECT OF MATERNAL FEED
RESTRICTION ON METABOLIC AND
CONTRACTILE PROPERTIES OF
MUSCLE FIBRES OF RABBIT
OFFSPRING

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One hundred and forty hybrid female rabbits of 15 wk were randomly divided into 3 groups and assigned to one of the 3 following diets administered till the first parturition: "C" diet, commercial diet for young females (DE = 11.71 MJ/kg d.m.) fed *ad libitum*; "R" diet, was the C diet fed restricted at 80% of *ad libitum*, "F" diet, commercial diet rich in fibre (24.6% vs 18.7% of C diet; DE = 9.77 MJ/kg d.m.) fed *ad libitum*. The young females were artificially inseminated at the 19th wk of age. On ten does per each experimental group, 3 pups of their first offspring were randomly selected and slaughtered at birth, at weaning (35d) and at the end of fattening period (81d), respectively. At the second parturition, another pup per doe was slaughtered at birth. Ten minutes *post mortem* the LL muscle was sampled and underwent the histochemical treatment. On rabbits of 35 and 81d of age the fibre type distribution (β R, α R or α W), the mean cross-sectional area and the compactness index (perimeter²/area) of each fibre type were determined. Fibres of the new-born rabbits' LL muscle were stained only for the assessment of histomorphological characteristics. The maternal feed restriction increased the compactness index (1.84 vs 1.74, $P < 0.01$) of LL fibres of new born rabbits of first kindling. At weaning, the young rabbits belonging to the first kindling exhibited a residual effect of maternal feed restriction on

fibre type distribution: β R fibres were increased ($P < 0.05$) and α W fibres were reduced ($P < 0.01$) with R diet. The probable nutrient deficiency of does induced by quantitative feed restriction could have delayed the fibre's differentiation of offspring LL muscle. At 81 days of age, no residual effect of maternal dietary treatment was found on offspring, either on fibre type distribution or on fibre histomorphological characteristics.

EFFECT OF FEED RESTRICTION
DURING POST-WEANING GROWTH ON
MUSCLE ENERGY METABOLISM AND
ON FIBRE CONTRACTILE AND
METABOLIC PROPERTIES OF *Biceps*
femoris MUSCLE IN THE RABBIT

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At weaning (35 days), 50 hybrid rabbits were randomly divided into 5 groups (blocks) and individually caged. Block 1 was fed *ad libitum* during weaning with a commercial diet until slaughter at 5 wk of age. From 5 to 8 wk of age, the rabbits from blocks 2 and 4 received 70% of *ad libitum*, meanwhile those belonging to blocks 3 and 5 received 90% of *ad libitum*. Animals of blocks 2 and 3 were slaughtered at 8 wk of age. On the remaining rabbits of blocks 4 and 5 the restriction levels were reversed until slaughter at 11 wk of age. Rabbits were weighed before slaughtering and the BF muscles were immediately dissected. One BF muscle was used for histochemical

analysis (fibre type distribution according to β R, α R and α W classification, mean cross-sectional area and compactness index - perimeter²/area) meanwhile the other was treated for the determination of enzyme activities characteristic of the glycolytic (aldolase) and oxidative (NADP-isocitrate dehydrogenase: ICDH) energetic pathways. The distribution of the same quantity of food in two different modes (70-90% or 90-70% of the *ad libitum*) resulted in different weights at 11 wk of slaughter age. Early feed-restriction followed by a more liberal feeding treatment applied from 8 to 11 wk of age (70-90% feeding plan) induced, together with a compensatory growth rate, an intense glycolytic metabolism to the detriment of the oxidative metabolism and by consequence a significant reduction of the proportion of β R fibres. The cross-sectional area of the 3 types of fibres doubled from block 1 (5 wk of age) to block 5 (11 wk of age and 90-70% feeding plan), but while the growth of β R and α W fibres continued till block 5 that of α R fibres stopped in block 2 (8 wk of age and 70% of *ad libitum*). However, no difference seemed to be evident for mean cross-sectional area of BF fibre types among rabbits differently feed-restricted. The compactness index, which indicates the fibre deformation induced by pathological states, was not related to the experimental treatments.

EFFECT OF GENOTYPE ON CARCASS TRAITS OF RABBITS

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Carcass traits of purebred Pannon White (PP, n = 84), Hyplus hybrid (HH, n = 77), parents of H♀×P♂... (HP, n = 97) and P does ×H♂ (PH, n = 79) rabbits, slaughtered at 12 weeks of age, were compared. Dressing percentage of PP (58.0%) and HP (58.7%) was higher than that of HP (57.7%) and HH rabbits (57.6%). The effect of genotype on the ratio of the fore part (14.2, 14.7, 14.8 and 14.4%, $P<0.001$) and on that of hind part (19.5, 19.4, 19.2 and 19.1%, $P<0.01$) to body weight in groups PP, HP, PH and HH, respectively, was significant. The most significant differences were found in the m. *longissimus dorsi* to body weight ratio (HH: 5.47%, HP: 5.20%, PH: 4.94%, HH: 4.87%, $P<0.01$). The ratio of perirenal fat was the highest in PP and HP genotypes (0.56 and 0.57%) and the lowest ($P<0.01$) in group of PH and HH rabbits (0.43 and 0.41%). According to the results, the selection for improving the most valuable parts of body (dressing percentage, intermediate and hind parts of carcass) by CT was successful, since the highest values were found in the PP and HP genotypes.

EFFECT OF GENOTYPE AND NUTRITION ON THE CARCASS TRAITS OF GROWING RABBITS

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Pannon White rabbits selected for high (HIGH) or low (LOW) total body fat content were weaned at 4 weeks of age and fed three isocaloric diets (12.87, 12.83 and 12.84 MJ/kg DE, respectively). Compared to the *ad libitum* fed group (H), the daily ration was reduced by 10% (M) and 20% (L). Proportional to the reduction of feed intake, the nutrient density of diets was increased (crude protein: 17.5, 19.8 and 21.9%; crude fibre: 12.9, 13.4 and 14.7%, respectively). Thus, the energy intake was reduced while the intake of nutrients remained similar among the different experimental groups. The aim of the experiment was to study the effect of different energy intake (nutrition) on the carcass traits of growing rabbits selected for different body fat content (genotype). The effect of genotype was less definite than that of nutrition. The selection for high body fat content improved the dressing out percentage significantly (58.2

and 57.3% in groups HIGH and LOW respectively; $P<0.01$), the ratio of the intermediate (16.3 and 15.9%, respectively; $P<0.01$) and hind parts of carcass to live weight (19.5 and 19.2%, respectively; $P<0.05$), and reduced the ratio of the full gastrointestinal tract to live weight (13.9 and 14.4%, respectively; $P<0.01$). Genotype had no significant effect either on the weight or on the ratio of the perirenal fat related to live weight. The reduction of energy intake decreased the live weight and all of the body parts significantly ($P<0,001$), but it had no

effect on the dressing out percentage. According to these results, the dressing out percentage of rabbits selected for high body fat content is better than that of the rabbits selected for low body fat content at the same age and having the same body weight. In breeds susceptible to becoming fatty the reduction of energy intake can help to reduce the body fat content. However, this reduction of energy intake is disadvantageous, because it reduces the body weight gain, and rabbits take longer to reach slaughter weight .
