ANDERS KARLSSON, ANN-CHARLOTTE ENFÄLT, BIRGITTA ESSEN-GUSTAVSSON, KERSTIN LUNDSTRÖM, Media, HANSSON, LOTTA RYDHMER and SUSANNE STERN WERNS KARLSSON, ANN-CHARLOTTE ENFÄLT, BIRGITTA ESSEM NGEMAR HANSSON, LOTTA RYDHMER and SUSANNE STERN Wedish University of Agricultural Sciences, S-750 07 UPPSALA, Sweden

INTRODUCTION: In commercial pig breeding, carcass meat content and daily gain are traits of Reat economic importance. Both traits are affected by genetic selection as well as by the diet of the monomic importance. Both traits are affected by genetic selection, meat content, and dressing diet ^{economic} importance. Both traits are affected by genetic structure of the structure Percentage and a lower carcass fat content than pigs given a low protein diet (see e.g. DAVYN Rep. 1989). The lower intramuscular fat and a lower carcass fat content than pigs given a tow process intramuscular fat BRESKIN, 1978; POND et al., 1980; ADEOLA and YOUNG, 1989). The lower intramuscular fat ^{Content} in Pigs given a high protein diet may lead to meat with a poorer sensory quality (drier and less and less tender) than that from fatter pigs reared on a low protein diet (see e.g. LEE et al., 1967; RAMSEY et al., 1990). In previous studies the effects of dietary protein content on the relation between muscle charact-Production and carcass traits were studied, but not on the relation between muscle charact-Bristics and meat quality.

The Purpose of this investigation was to study the relationship between muscle histochemical bios $t_{i_{s_{u_e}}}^{i_{u_e}}$ purpose of this investigation was to study the relationship between matter a higher lean $t_{i_{s_{u_e}}}^{i_{u_e}}$ biochemical properties and technological meat quality during selection for a higher lean to some degree ^{Diochemical} properties and technological meat quality during selection for the some degree between growth rate. Comparisons were made between low and high protein diets and to some degree between generations.

VATERIAL AND METHODS: The animals studied were purebred halothane-gene-free Swedish York-Migh (HP; 18.5% crude protein (CP), 0.96% lysine) and a low (LP; 13.1% CP 0.64% lysine) protein diet was $u_{e_t}^{(Hp; 18.5\%)}$ crude protein (CP), 0.96\% lysine) and a low (LP; 13.1% CF 0.010 lysine) $u_{e_t}^{(Hp; 18.5\%)}$ fed when selecting for increased lean tissue growth rate. In the present study pigs from the selecting for increased lean to slaughter at a live weight of 103 kg. After Wes fed when selecting for increased lean tissue growth rate. In the protection f^{Wes} from generation 1 and 4, and they were sent to slaughter at a live weight of 103 kg. After l_{east} sere stunned with low voltage electricity At least two hours of rest in the lairage the animals were stunned with low voltage electricity the first in the lairage the animals were stunned with low voltage was measured on the floor at an abattoir in Uppsala. Sidefat, growth rate and lean percentage was measured ^{iccording} ^{the} floor at an abattoir in Uppsala. Sidefat, growth rate and lean percentage and le histochemical and biochemical analyses were taken from M. longissimus dorsi (LD) at the last the from the firm ^{tochemical} and biochemical analyses were taken from M. longissimus doing (1), ^{trom} the red part (rectus femoris) of M. quadriceps femoris (QF) in generation 1 and 4, ^{trom} the red part (rectus femoris) of M. quadriceps femoris (QF) in generation 1 and 4, ^{(from} the red part (rectus femoris) of M. quadriceps femoris (QF) in generation ^{(h)q} from M. biceps femoris (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femoris (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femoris (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femoris (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femoris (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femoris (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femories (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femories (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femories (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femories (BF) in generation 4. The samples were taken immediately after ^{(h)g} anguine. Diceps femories (BF) in generation 4. The samples were taken immediately after (h)g anguine. Diceps femories (BF) in generation 4. The samples were taken immediately after (h)g anguine. Diceps femories (BF) in generation 4. The samples were taken immediately after (h)g anguine. Diceps femories (BF) is a sample (h)g anguine. Diceps femories (h) ^{trom} M. biceps femoris (BF) in generation 4. The samples were taken indexed 24h - 48h ^{POst} Mort and were stored at -80°C until analysis. Meat quality was analysed 24h - 48h Muscle fibre types we

The fibre characteristics Muscle fibre types were identified by staining transverse fiel sector preincubation at pH 4.3, 4.6 and 10.3 Replace fibre characteristics Muscle fibre types were identified by Stating Replace fibre characteristics Muscle fibre types were identified by Stating (BROOKE actions for myofibrillar ATP-ase activity after preincubation at pH 4.3, 4.6 and 10.3 $(B_{R}O_{OKE} and KAISER, 1970)$. Glycogen content and the activities of the enzymes citrate syntase (LDH) and hexokinase (HK) were (ζ_S) , and KAISER, 1970). Glycogen content and the activities of the enzymes (HK) were analysed by the second ¹, 3-OH-acyl-CoA dehydrogenase (HAD), lactate dehydrogenase (LDH) and herostingenase (BAD), lactate dehydrogenase (LDH) and herostingenase (BAD), lactate dehydrogenase (LDH) and herostingenase (Second as described previously (ESSEN et al., 1980; ESSEN-GUSTAVSSON et al., 1984; ESSEN-¹/₂ ¹/₂ ^{AVSed} ^{as} described previously (ESSEN et al., 1980; ESSEN-GUSTAVSSON et al., 1980, Ipid ^{OKIAVSSON} et al., 1991). These analyses provide a measure of oxidative capacity (CS), lipid ^{OKIdation} (UK and LDH) of the muscles. ^{AVSSON} et al., 1991). These analyses provide a measure Mation (HAD) and glycolytic capacity (HK and LDH) of the muscles.

Meat (HAD) and glycolytic capacity (HK and LDH) of the muscles. (HAD) and glycolytic capacity (Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and as surface Mennessy Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 nm), and Auckland, MENNESSY (MAN), and Auckland, M ^{Neg}sey Grading Probe (GP, Hennessy Grading System, Auckland, NZ; 590 Imm), and ^{Nog} (GP, Hennessy Grading System, Auckland, NZ; 590 Imm), and ^{Nog} (M), Market Measured with EEL using the Y-filter (EEL-Y; Evans Electro Selenium Ltd., UK; 400-(b), Market Measured with EEL using the Y-filter (EEL-Y; Evans Electro Selenium Ltd., UK; 400-(b), Market Measured as the loss of water ^{14C}Ctance, measured with EEL using the Y-filter (EEL-Y; Evans Electro Selentum Locard water ¹⁰⁰ mm). Water holding capacity was measured as (1) drip loss, measured as the loss of water ¹⁰⁰ loss a 2 r ^(hm), Water holding capacity was measured as (1) drip loss, measured as the 1000 ^(yan), Water holding capacity was measured as (1) drip loss, measured as the 1000 ^(yan), ^(yan) 1_{987} , 2.5 cm thick slice of muscle, hanging for 4 days in a polyethene bag at the score used t_{987} , and (2) subjectively as filter paper wetness (KAUFFMAN et al., 1986). The score used t_{98} from a subjectively as filter paper and 5 the other extreme. Extractability of ^(a) and ⁽²⁾ subjectively as filter paper wetness (KAUFFMAN et al., 1980). Inc. ^(a) and ⁽²⁾ subjectively as filter paper wetness (KAUFFMAN et al., 1980). Inc. ^(b) and ⁽²⁾ subjectively as filter paper and 5 the other extreme. Extractability of ^(b) and ⁽²⁾ to 5, where 0 means a dry filter paper and 5 the other extreme. Extractability of ^(b) and ⁽²⁾ and ⁽²⁾ bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) and ⁽²⁾ bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) and ⁽²⁾ bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) and ⁽²⁾ bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) and ⁽²⁾ bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) and ^(b) bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) and ^(b) bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) and ^(b) bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) bubblectively as filter paper and 5 the other extreme. Extractability of ^(b) bubblectively as filter paper and 5 the other extreme. Extractability of bubblectively as filter paper and 5 the other extreme. Extractability of bubblectively as filter paper and 5 the other extreme. Extractability of bubblectively as filter paper and 5 the other extreme. Extractability of bubblectively as filter paper and 5 the other extreme. Extractability of bubblectively as filter paper and 5 the other extreme. Extractability of bubblectively as filter paper and 5 the other extractability of bubblectively as filter paper and 5 the other extractability of bubblectively as filter paper and 5 the other extractability of bubb total from 0 to 5, where 0 means a dry filter paper and 5 the other extreme. Extraction proteins were proteins (sarcoplasmic and myofibrillar proteins) and the sarcoplasmic proteins (los Made $M_{\theta_{k_{\theta}}}$ muscle proteins (sarcoplasmic and myofibrillar proteins) and the sarcoplasmic $(1_{\theta_{\theta_{k_{\theta}}}})$ and $(1_{\theta_{\theta_{k_{\theta}}}})$ on minced muscle by a modification of the method described by LUNDSTRÖM et al. (1988), For generation 1 the BCA-method (SMITH et al., 1985), and for generation 4 the biuret lap, was ^{veg}). For generation 1 the BCA-method (SMITH et al., 1985), and for generation 4 the myofibril-^{lay proteine} used for determining the protein concentrations. From these results the myofibril-^{lay proteine} A generation 1 the BCA-method (Sales and Sales Proteins were calculated as the difference between total and sarcoplasmic proteins were calculated as the difference between total and sarcoplasmic proteins (Internet content was analysed as alkaline hematin according to the method of KARLSSON & LUND-(1991) total and crude protein (CP) were analysed in samples (Tecator ^{340ent} content ¹¹⁰ content was analysed as alkaline hematin according to the method of KARABA ¹¹⁰ (1991). Intra muscular fat content (IMF) and crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed in samples ¹¹⁰ in content (IMF) and Crude protein (CP) were analysed (IMF) and Crude protein (CP) were analysed (IMF) and Crude protein (IMF) and Crude pro (1991). Intra muscular fat content (IMF) and crude protein (CP) were analysed in the in generation 4 using the Soxtex System H⁺ (IMF) and Kjeltec (CP) equipments (Tecator Method Sanage C) AB, HD in generation 4 using the Soxtex System H* (IMF) and Kjeltec (CP) equipmented (Radiometer PHM63, Radio-Meter, Copenter, Copenter Weter, Copenhagen, DK).

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Statistical analyses The data were analysed with the Statistical Analysis System (SAS Institute of the statistical Analysis System (SAS additional statistical statistical analysis System (SAS additional statistical tute Inc., 1985). The models used included the fixed effects of generation, diet, sex and difference of slaughter. When analysing drip loss the models of slaughter. When analysing drip loss, the model used was corrected for initial sample weight by regression. The interaction between service in the sample weight in the sample by regression. The interaction between generation and diet was included in the model when the mo

<u>RESULTS: Muscle fibre characteristics</u> No marked changes were seen in the percentage of Type I IIA or IIB fibres between the diets and concerti IIA or IIB fibres between the diets and generations. A somewhat higher proportion of Type fibres and a lower proportion of Type IIB fibres was found in QF in LP animals in generation

LP animals had a significant lower LDH activity in all muscles compared with HP animals had a significant lower LDH activity in all muscles compared with HP animals but it activity it activity in all muscles compared with HP animals but it activity it activi both generations. In generation 4 HP animals had increased LDH activity and decreased HK activity is the second to ity in LD and QF, compared with generation 1. Animals in generation 4 had a slightly higher activity than in generation 1. The results are characteristic activity than in generation 1. activity than in generation 1. The results are shown in Tables 1 and 2. Glycogen content is slaughter was significantly correlated to ultime. slaughter was significantly correlated to ultimate pH for LD and QF in generation 1 (LD , r 0.46; QF, r=-0.75) and only for PF in generation to the second secon 0.46; QF, r=-0.75) and only for BF in generation 4 (BF, r=-0.55).

<u>Carcass characteristics and technological meat quality</u> Sidefat, lean percentage and growth the differed significantly between HP and LP distance. rate differed significantly between HP and LP diets (14 vs 20 mm; 64 vs 59 %; 838 vs 694 g th respectively; p<0.001). Significant differences in the second diets were found in both generations where HP animals had a significant higher water holding capacity, measured as filter paper wetness. Lower modelet capacity, measured as filter paper wetness, lower reflectance, and a higher protein extracability in LD compared to LP (Table 3). There was not a filter protein extraction of the second secon ity in LD compared to LP (Table 3). There was no significant difference in the myofibrill^b protein extractability between the diets. When a convert protein extractability between the diets. When a comparison of the protein extractability between the diets is a comparison of the protein extractability between the diets. generation 4 was made on a fat free basis, i.e. after correction for IMF, the difference between the still significant for the second states decreased but it was still significant for the second states the second states and the second states are still significant for the second states are stated by the second states are stated as a state state are stated as a state are stat ween diets decreased but it was still significant for the sarcoplasmic proteins $(P^{<0.05)}$

In LD, the IMF was different between diets (1.1% vs 2.4% in HP and LP, respectively).001). The correlation between IMF and reflectance p<0.001). The correlation between IMF and reflectance was zero in HP and LP, respective in LP, measured both as internal and surface reflectance (reflectance) to the set of the measured both as internal and surface reflectance (r=0.40 for both; p<0.05). There $w^{a\beta}$ alfore difference in CP in LD between diets (23.18 we 22.46 in the second sec difference in CP in LD between diets (23.1% vs 22.4% in HP and LP, respectively; $P^{<0.05)}$.

<u>DISCUSSION</u>: The two muscles LD and QF were choosen as they are known to differ in their use $f^{(0,05)}$. composition and metabolic characteristics (LUNDSTRÖM et al., 1989). The results for muscles in composition and enzyme activities activities in composition and enzyme activities in composition activities activi fibre type composition and enzyme activities in generation 1 in this study show that LD and the for muscle and metabolic properties. differ in both the contractile and metabolic properties. LD is the most used indicator phile in this study show that indicator the study show that indicator the study studies, and the main emphasis in the most used indicator the study studies. in meat quality studies, and the main emphasis in the meat quality evaluation here was thus put on this muscle. QF consists of four parts, and is there? on this muscle. QF consists of four parts, and is therefore difficult to use in many meat ity analyses. BF was taken in generation 4 in order to it. ity analyses. BF was taken in generation 4 in order to include an easily defined ham muscle. The higher oxidative and lower glucolutions

The higher oxidative and lower glycolytic capacity in QF than in LD is to some extent property of the higher Type IIA/IIB ratio in OF bly related to the higher Type IIA/IIB ratio in QF. Type IIA fibres usually have a higher difference oxidative capacity than Type IIB fibres (ESSEN-GUSTAVCCOV) oxidative capacity than Type IIB fibres (ESSEN-GUSTAVSSON & LINDHOLM, 1984). The same difference there in metabolic profile between these two muscles ces in metabolic profile between these two muscles, were also found in generation 4. However, the same difference of the seemed to be a slightly higher oxidative constitution of the second in generation 4. there seemed to be a slightly higher oxidative capacity in generation 4 in both m^{uscles} , m^{ascles} greatest change in oxidative capacity was found in animals fed the LP diet. In HP animals to a single of the term of glucoscover in the 4th generation where the term of glucoscover is a single of the term of glucoscover in the term of glucoscover is a single of the term of term of glucoscover is a single of the term of term o glycolytic capacity was increased in the 4th generation, whereas the capacity for phosphory for that the tion of glucose was however, lowered as indicated by the HK activity. These results of the upper of the the concentration of protein in the diet could in th that the concentration of protein in the diet could influence the metabolic profile of important for ultimate pH. In both muscle. In this study it was also seen that the amount of glycogen at slaughter is important of the metabolic profile of for ultimate pH. In both generations the glycogen content differed between muscles, with a mither glycogen content in LD in comparison with OF. This is like the difference of the seen in fibre turing higher glycogen content in LD in comparison with QF. This is likely related to the difference that the dif seen in fibre typing and metabolic profile between the muscles. It has been shown that fibre and IIA fibres were depleted of glycogen in connections and the shown that fibre in the shown the and IIA fibres were depleted of glycogen in connection with slaughter, while Type IIB fibres that fibres were left (ESSEN-GUSTAVSSON et al., 1991) all still had glycogen left (ESSEN-GUSTAVSSON et al., 1991). All muscles studied showed a negative correlation between glycogen content and pH₀, which shows the studied showed a negative concentration studied showed a negative studied showed a studied st correlation between glycogen content and pH₀, which shows the importance of the muscle glycogen is the ultimate meat quality. It can be concluded that technological meat quality was slightly better in animals feet

by compared with the LP diet indicated by a higher water holding capacity, lower reflectance by higher protein extractability. This result was consistent in both generations. A high meat wigher protein extractability. This result was consistent in both generatively but this was not found and the carcass has often been related to poorer meat quality, but this was not found and the carcass has often been related to poorer meat quality, but this was not found and the carcass has often been related to poorer meat quality. ¹⁷ Were, An explanation for this may be that in studies where a high meat content was negatively ¹⁷ Orrelated to poorer meat quality, See the studies where a high meat content was negatively to be a studies where a high meat content was negatively included. The pre-An explanation for this may be that in studies where a high mode build be a studied. The pre-^{lelection} to meat quality, animals with the halothane gene were usually included. The pre-^{blection} against the halothane gene which was done before the Swedish selection experiment ^e ^{vertion} against the halothane gene which was done before the second here. ^{for the may} be the explanation why this negative relationship was not found here.

A low Water holding capacity is an indication of PSE (Pale, Soft, Exudative) meat. There was ^{1 low} water holding capacity is an indication of PSE (Pale, SOIL, EAUGULTS), ^{3 significant} difference in drip loss between the two diets, but the difference in filter ^{4 per water holding capacity is an indication of PSE (Pale, Soil, EAUGULTS),} ^{Agnificant} difference in drip loss between the two diets, but the difference difference in drip loss between the two diets, but the difference difference difference is drip wetness was significant. In the study of KAUFFMAN et al. (1986), which included PSE difference diffe Wetness was significant. In the study of KAUFFMAN et al. (1900), million our study, the but breast, a high correlation between these two methods (r=0.90) was found. In our study, the intra-^{vasses}, a high correlation between these two methods (r=0.90) was found. In the intra-tion was significant but lower (r=0.42; p<0.001). In meat from PSE carcasses the intra-To Mular space is reduced as the myofibrills are more compressed than in normal meat (OFFER ¹ ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ¹ ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ¹ ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed than in the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed the muscle fluid to the extracellular space ^{(ular} space is reduced as the myofibrills are myofibrills are more compressed the muscle fluid to the extracellular space ^{(ular} space is reduced as the myofibrills are more compressed the muscle fluid to the extracellular space is the muscle fluid to the extracellular space is the muscle fluid to the extra space is the muscle fluid to the extra space is the muscle fluid to the extra space is the muscle fluid to the muscle flui which it can be released as drip loss. The difference in significance levels between the Which it can be released as drip loss. The difference in significance is that there used here for measuring water holding capacity may be explained by the fact that there is a loss that there difference between diets was found in We used here for measuring water holding capacity may be explained by the term a low PSE frequency in our material. A significant difference between diets was found in between the myofibrillar proteins. The sarco-A low PSE frequency in our material. A significant difference between under the sarco-the extractability of sarcoplasmic proteins but not of the myofibrillar proteins. The sarcoextractability of sarcoplasmic proteins but not of the myoriprinal proteins about 3% of the total muscle proteins, can bind about 3% of the total muscle proteins, can bind about 3% of the proteins, which account for 30% of the total muscle proteins, can bind about 3% of the proteins are proteins. Which proteins, which account for 30% of the total muscle proteins, can bind these prote-Water content (KUNZ and KAUFFMAN, 1974, cit. LOPEZ-BOTE et al., 1989). When these prote-^{de} water content (KUNZ and KAUFFMAN, 1974, cit. LOPEZ-BOTE et al., 1909). More denature, the liberated water can still be held in the muscle by capillary forces, and may Wenature, the liberated water can still be held in the muscle by capiting approximation of the significant differences in filter paper wetness may explain the detected as drip loss. The significant differences when the filter paper is applied ^{vefore} not be detected as drip loss. The significant differences in fifter paper is applied ^{vefore} the move by the fact that the capillary force which occurs when the filter paper is applied the meat surface, can help to release the water which was liberated when the sarcoplasmic for formunication). A possible explanation for ^{wie} meat surface, can help to release the water which was liberated when ^{woteins} were denatured (E. TORNBERG, 1991, personal communication). A possible explanation for ^{we} diffe ^{veins} were denatured (E. TORNBERG, 1991, personal communication). A possible of the large difference in extractability of the sarcoplasmic proteins between diets may be the large difference in extractability of the sarcoplasmic proteins between diets and a subcutanous fat, thus decreasing the cooling rate for carcasses from pigs on the diet.

When measuring the meat colour as reflectance the choice of wave length is of importance, as reflection to the structure and IMF When measuring the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the measuring the meat colour as reflectance the choice of wave length is of improve ^{when measuring} the measuring the measuring the measure of the choice of wave length is of the measure of the mea th theflectance is affected by factors such as pigment content, protein service of the service ⁽¹⁾ ^{(vent}, Surface reflectance measured with the EEL-Y will be influenced by all ⁽¹⁾

When the PSE-frequency is low (LUNDSTRÖM et al., 1988). In for the changes seen in enzyme activities between generations indicate that selec-Non for high meat content and/or the protein level of the diet may influence muscle metabolic Profile.

The difference between diets for technological meat quality was consistent between generathe difference between diets for technological meat quality was consistent between diets for technological meat quality in carcasses from the HP line, probably due to a decrease from the transfer technological meat quality in carcasses from the HP line, probably due to a decrease transfer to a decrease trans We with a slightly better meat quality in carcasses from the HP line, produced we rate of cooling in the fat LP pigs. A high meat content is usually related to a decrease to a decrease of cooling in the fat LP pigs. The preselection made on the animals used in this Were rate of cooling in the fat LP pigs. A high meat content is usually related to a study to all this was not found here. The preselection made on the animals used in this was not found here the selection experiment was started could be an the generations Meat and of cooling in the fat LF pigs. The preselection made on the animals and the selection made on the animals and the selection experiment was started could be an applanation of the halothane gene before the selection experiment was started could be an animal of the pigs before $w_{1}^{\rm uv}$ to eliminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started $w_{a_{0}}^{\rm uv}$ eleminate the halothane gene before the selection experiment was started ^{vanation} for that. A slight increase in the water-holding capacity between the gradient of the pigs before ^{vanghter} of this was due to selection or to an improvement in handling of the pigs before New Cannot be determined.

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	east-squares means and levels of s wo protein diets in generation 1 Generation 1									Gener	cation	n 4	
	LD			QF			LD			BF		QF	
Variable	HP	LI	2	HP	L	P	HP	LI	2	HP	LI	P	HP
Fibre type	(8)		a sease		1.		120.00						
Type I	11	8	n.s.1)	7	15	**	7		n.s.			#	18
Type IIA	8		n.s.	22		n.s.	9		n.s.			n.s.	
Type IIB	81	83	n.s.	72			82		n.s.			n.s.	57
IIA/IIB ²)	0.1		n.s.	0.2	1.0	*	0.1	0.1	n.s.	0.2	0.2	n.s.	0.7
Enzyme activ	vity	(mmo)	L*kg-1 1	min-1			1999. 1997.			18-9-142	8 8 4 K		
CS	6	6	n.s.	15	17	n.s.	9		n.s.			n.s.	17
HAD	10	14	***	14	15	n.s.	14		n.s.			n.s.	16
HK * 100	46	35	*	56	49	n.s.	32		n.s.			n.s.	16 40 2298
LDH	2975	2515	***	1970	1661	***	3379	2716	***	3238	2610	***	2298
Glycogen (1	mol*	kq-1)											
<u></u>	160	221	**	93	75	n.s.	245	204	*	180	179	n.s.	115

1) Levels of significance: n.s. = p>0.10; # = p<0.10; * = p<0.05; ** = p<0.01; 2) Ratio between type IIA and IIB fibres

A Real Parts of the	Genera	tion 1		Generation 4		
	LP	HP		LP	HP	
M.longissimus dorsi	1000					
	4.7	4.5	n.s.	4.0	3.6	n.s.
Filter paper wetness			**	1.2	0.8	*
EEL-Y	21.6	19.3	*	18.2	17.9	n.s.
GP	97	72	***	.95	86	***
Protein extractabili	ty (mg	/a wet	wt.)			
Total	146.7	166.6	#	128.9	146.0	#
		62.0	n.s.	66.0	73.2	**
		36.6		38.6	40.0	n.s.
pH _u		5.75	#		5.53	n.s.
M.biceps femoris	5.05	5.75			and and a se	
Drip (%)	-	-		2.2	2.7	n.s.
Filter paper wetness		_			0.8	n.s.
GP	1. 2				88	#
EEL-Y					16.1	n.s.
Protein extractabili	ty (mo	/a wet	wt.)	2011		
Total	cy (mg	/ y		141.7	146.0	n.s.
					69.6	***
Sarcoplasmic	5.88	5.87	n.s.		5.74	#
pHu N mundaiceana femoria	5.00	5.01		5.00	5.71	
M. quadriceps femoris	6 15	5.95	#	6.15	5.89	*
pHu	0.13	5.95	π	0.13	5.05	

Table 3. Least-squares means and levels of significance¹) for meat quality parameters between lines in generation 1 and 4

1) See table 1.