

# STUDY ON SELECTED QUALITY TRAITS OF PORK MEAT FROM FATTERNERS DERIVED FROM CROSSING NAIMA SOWS WITH DIFFERENT BOAR LINES

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**Abstract** - Quality and process ability of meat from fatteners coming from crossing sows of a hybrid line Naima with boars of selected, new paternal lines Penarlan was analyzed. Analyses were carried out on 120 samples of the *longissimus dorsi* muscle from fatteners divided into 4 groups, of which each was represented by a different genotype of the sire, i.e. Solbeck, Neckar, P-76 (experimental groups) and Duroc (the control). Statistically significant differences were found between selected physico-chemical traits of meat. Fatteners coming from crossing of boars of hybrid lines were characterized by a slightly inferior water holding capacity and higher natural drip. Statistically significant more advantageous flavour and palatability were recorded for cooked meat from fatteners sired by a Solbeck boar. Obtained results indicate that among the four analyzed genetic groups coming from crossing of Naima sows with boars of all hybrid lines were characterized by advantageous meat quality parameters.

**Index terms** - pigs, meat quality, Penarlan, boars

## I. INTRODUCTION

In Poland for many years now a considerable improvement has been observed in the quality of slaughter material. This is manifested both in increased leanness of fatteners and the proportions of prime cuts in the carcass, as well as reduced carcass fatness (Grześkowiak, 2005). An increasing proportion of imported high-producing lines has been observed in the commercial production of fatteners. In the national material base an increasing proportion of pigs of hybrid lines is observed (Grześkowiak 2003).

The Duroc breed is frequently used in commercial crossing. This breed is characterized by optimal leanness and a relatively low proportion of quality defects. An additional advantage, improving particularly sensory attributes, is connected with the intramuscular fat content, higher than in other breeds (Grześkowiak 2002, 2003, Różycki 2003, Niemyjski 2007).

In the creation of a maternal, hybrid Naima line pigs of Chinese breeds were used, which are characterized by hyperprolificacy and good carcass quality, thanks to which a sow with optimal maternal characteristics was selected (Niemyjski 2006).

In recent years boars of new hybrid lines Penarlan, i.e. P76, Solbeck and Neckar, have been imported to Poland. These boars provide their offspring with optimal slaughter value and meat quality traits (Grześkowiak 2003, Niemyjski 2007). Studies conducted so far have been based on observations of the population coming from crossing of Naima sows with boars of line P76. However, there are no literature data concerning progeny of boars from the other paternal lines.

Studies conducted by several authors indicate an adverse dependence between an increase in leanness and deterioration of quality traits in culinary and processing meat, which may also be manifested in a deterioration of sensory attributes (Brandt 1997, Grześkowiak 2003).

The aim of the study was to determine quality and processability of meat from fatteners coming from crossing sows of a hybrid line Naima with boars of selected, new paternal lines Penarlan.

## II. MATERIALS AND METHODS

Analyses were conducted on 120 samples of the *longissimus dorsi* muscle from fatteners divided into 4 groups, of which each was represented by a different genotype of the sire, i.e. Solbeck, Neckar, P-76 (experimental groups) and Duroc (the control). A Naima sow was the dam in each group.

During carcass cutting samples were collected from the lumbar section of *m. longissimus dorsi* for laboratory analyses. These analyses included the determination of several quality attributes of meat, such as water holding capacity, colour in the L\*,a\*,b\* system, natural drip, weight loss during thermal processing, shear force, as well as determinations of intramuscular fat and basic chemical composition of meat. Samples of

thermally processed meat and cured and smoked LD muscle were subjected to organoleptic analyses of aroma, tenderness, juiciness and flavour.

Collected results of measurements were analyzed statistically. The variance of means was determined by calculating standard deviation. Statistical significance of the effect of selected experimental factors on analyzed slaughter performance traits was determined using the analysis of variance. Tukey's test was used in the comparison of means (Stanisz 1998).

### III. RESULTS AND DISCUSSION

Mean results in the evaluation of physico-chemical traits of meat from the tested genetic groups are presented in tab. 1. Statistically significant differences were found between selected physico-chemical traits of meat. Fatteners coming from crossing of boars of hybrid lines were characterized by a slightly inferior, although still acceptable water holding capacity and higher natural drip. Similar results were reported by Grześkowiak et al. (2003, 2005) and Niemyjski (2007). Moreover, we need to stress here also an advantageous colour of meat from hybrid fatteners, particularly those sired by the boar of line P76, which indicates good technological quality (Niemyjski 2007). Intramuscular fat content in the analyzed groups was similar, close to the optimal value of 2 - 3% (Wood 1994). Meat of fatteners sired by a Neckar boar was characterized by a slightly higher water content at the simultaneous reduced amount of protein.

As it results from graphs 1 and 2 (Figs. 1, 2), presenting sensory examination results of cooked meat and raw smoked sirloin, significant differences were found between the analyzed groups. Statistically significant more advantageous flavour and palatability were recorded for cooked meat from fatteners sired by a Solbeck boar. In the evaluation of the final product we need to stress a markedly inferior compensation and desirability of colour of sirloin in the experimental group sired by a Neckar boar. However, it may be connected with the technological process of curing.

### IV. CONCLUSION

Obtained results indicate that among the four analyzed genetic groups coming from crossing of Naima sows with boars of all hybrid lines were characterized by advantageous meat quality parameters. What is more, the usefulness of mass production from this investigated lines will not be decided by the quality of meat, which was good in all of the tested groups, but slaughter value or to be more precisely the meat content.

### ACKNOWLEDGEMENT

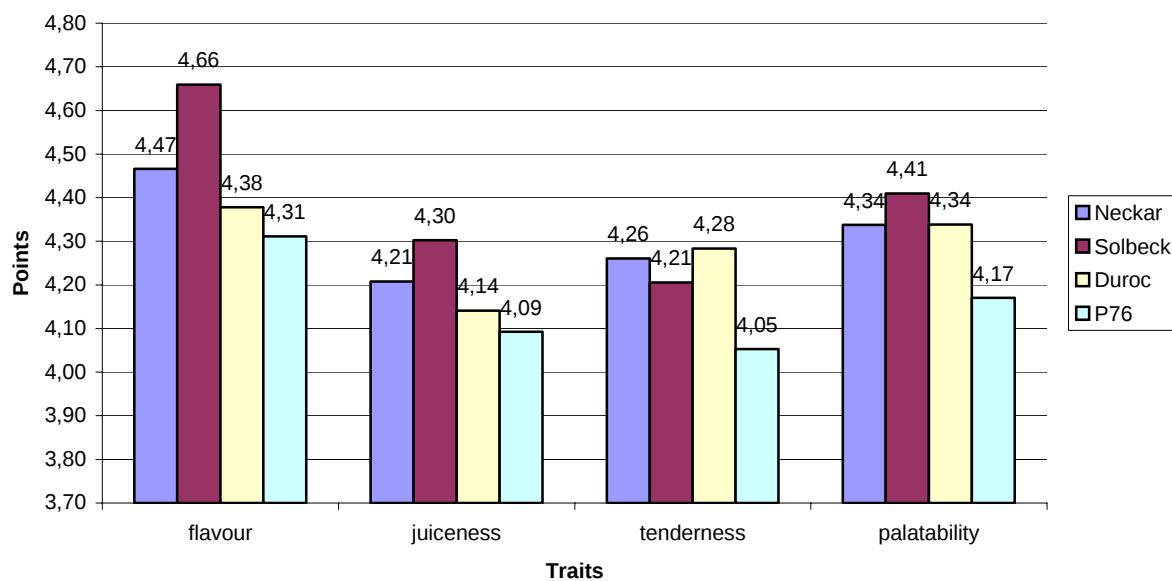
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**Tab.1. Meat quality characteristic of fatteners from investigated groups**

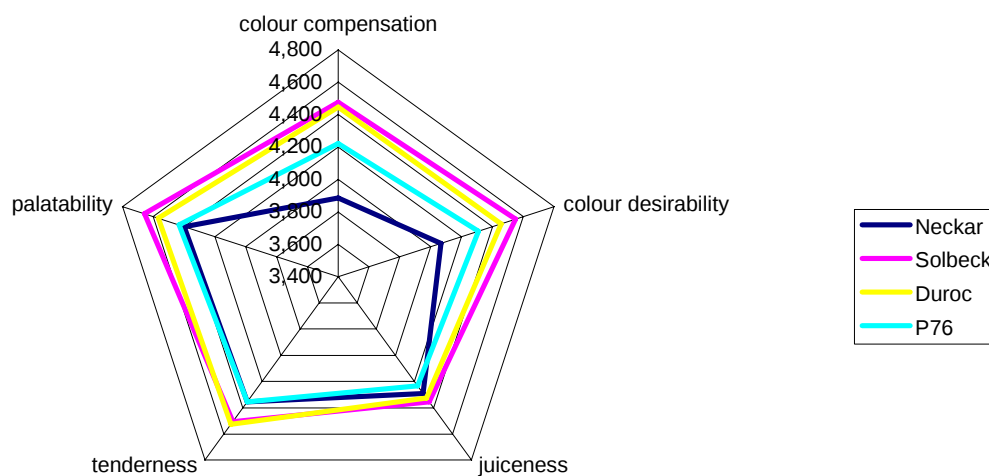
| Trait                    | Statistical measure | Group                |                      |                      |                      |
|--------------------------|---------------------|----------------------|----------------------|----------------------|----------------------|
|                          |                     | Neckar               | Solbeck              | P76                  | Duroc                |
| WHC, %                   | x                   | 32,08 <sup>A,D</sup> | 29,95                | 31,71                | 29,89 <sup>A,D</sup> |
|                          | s                   | 3,6                  | 3,3                  | 2,9                  | 2,9                  |
| Drip losses, %           | x                   | 4,54                 | 5,20 <sup>B,D</sup>  | 4,84                 | 3,33 <sup>B,D</sup>  |
|                          | s                   | 2,1                  | 1,9                  | 1,58                 | 1,6                  |
| Cooking losses, %        | x                   | 27,86                | 29,75                | 27,54                | 27,17                |
|                          | s                   | 4,9                  | 3,8                  | 3,6                  | 5,1                  |
| Water content, %         | x                   | 73,70 <sup>A,D</sup> | 73,13                | 73,47                | 72,91 <sup>A,D</sup> |
|                          | s                   | 0,8                  | 0,7                  | 0,9                  | 0,9                  |
| Fat content, %           | x                   | 1,86                 | 1,75                 | 2,11                 | 2,21                 |
|                          | s                   | 0,7                  | 0,6                  | 0,6                  | 1,1                  |
| Total protein content, % | x                   | 23,27                | 23,97 <sup>B,D</sup> | 23,26                | 23,70 <sup>B,D</sup> |
|                          | s                   | 0,8                  | 0,7                  | 0,7                  | 0,7                  |
| Colour, L                | x                   | 47,40 <sup>A,C</sup> | 47,61                | 49,27 <sup>A,C</sup> | 47,57                |
|                          | s                   | 2,1                  | 3,1                  | 3,5                  | 1,8                  |
| Meat content, %          | x                   | 56,39                | 58,40 <sup>A,D</sup> | 55,88                | 55,01 <sup>A,D</sup> |
|                          | s                   | 3,17                 | 1,77                 | 2,67                 | 3,38                 |

A,B,C,D difference significant at  $P < 0,01$  between groups

**Fig. 1. Sensory properties (points) of cooked muscle LD**



**Fig. 2. Sensory properties (points) of smoked loins**



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