CURRENT PROBLEMS AND TENDENCIES OF DEVELOPMENT IN PIG PRODUCTION

M. Währer

Abstract: Tendencies in development of pig production induced Germany and other European countries, as well as North America, to reevaluate their breeding and production strategies. Yugoslavia is also included in this global process.

Certain prognoses of current tendencies in pig production are possible only if we reconsider its development in the last ten years. Analysis is focused on comparing certain breeding traits and production results at the same time.

Key words: pig production, tendencies, development, global process

Introduction

Tendencies of development in pig production force not only Germany but also other European neighbour countries and North America to reconsider their breeding and production strategies. In this global process also Yugoslavia is included.

Certain prognoses about current tendencies only are possible when the development in the last ten years is analysed. The analysis focuses the comparison of selected traits of all kinds of pig breeding and production performances in this time.

Development in pig production

First, the different development of the total number of pigs in Europe and other areas can inform about the special situation in pig production (table 1).

The global total number of pigs is going on to increase continuously since a few years. In Europe nearly the same development can be observed, but not so dramatically. Here, the self-supply is about 109% continuously since a few years. But in Europe an important change can be observed. The proportionately of pig production in such traditional countries like Germany is degreased, and the proportion of Spain for pig production is increased strongly.

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Global analysis includes the USA too. It is an important competition for Europe, because there is a powerful potential for increasing in animal production. In the average in USA the pork consumption is only 8 kg per head and year. If it goes up to 9 kg, it means an increase of pig production about 13%.

Second, it is essential to analyse special features of breeding and production performance in pigs, which are important for an evaluation of this part in animal production. Most important features are reproduction performance, fattening performance and carcass evaluation.

In German pig industry the reproduction performance is increased since 15 years (table 2). It includes “litters/sow and year” and the “number of weaned piglets/sow and year”.

### Table 1. Total number of pigs in Europe, USA and World (in 1 Million)

<table>
<thead>
<tr>
<th>Year</th>
<th>EU-15</th>
<th>Germany/ Nemačka</th>
<th>Spain/ Španija</th>
<th>East-Europe/ Istočna Evropa</th>
<th>USA/ SAD</th>
<th>World/ svet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>121.3</td>
<td>34.2</td>
<td>16.9</td>
<td>113.0</td>
<td>53.8</td>
<td>-</td>
</tr>
<tr>
<td>1992</td>
<td>116.9</td>
<td>26.5</td>
<td>18.2</td>
<td>94.3</td>
<td>58.2</td>
<td>-</td>
</tr>
<tr>
<td>1995</td>
<td>115.9</td>
<td>23.7</td>
<td>17.6</td>
<td>80.2</td>
<td>58.2</td>
<td>763.6</td>
</tr>
<tr>
<td>1999</td>
<td>124.4</td>
<td>25.9</td>
<td>22.6</td>
<td>66.5</td>
<td>59.5</td>
<td>912.7</td>
</tr>
<tr>
<td>2000</td>
<td>-</td>
<td>25.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2. Development of reproduction performance in German pig industry

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Litters/sow &amp; year/ Leglo/krmča &amp; godina (n)</td>
<td>2.0</td>
<td>2.1</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Number of weaned piglets /sow &amp; year/ Br. odbijene prasadi po krmači godišnje (n)</td>
<td>17.7</td>
<td>18.6</td>
<td>18.6</td>
<td>19.7</td>
</tr>
<tr>
<td>Rearing losses/ Gubici u odgoju (%)</td>
<td>14.0</td>
<td>15.0</td>
<td>16.0</td>
<td>16.3</td>
</tr>
</tbody>
</table>
In comparison to this distinguishing marks the “rearing losses” increased too. This increase was higher, 15 %, than the development in “number of weaned piglets per sow and year”, which was only 11 %.

The second complex of major important feature in pig production is the fattening performance. In table 3 daily gain, side fat thickness and feed input for 1 kg body weight of boars after examination in test station of Saxony are demonstrated (Tischer and Eckert, 2000).

In the average the results are in a high level. They sign a high genetic potential in fattening performance in German Landrace, Large White and Pietrain. Best boars realised a daily gain more than 1100 g with a very low feed input, less than 2.2 kg/kg body weight during test period.

**Table 3. Features of boars after examination in test station Saxony, 2000**

<table>
<thead>
<tr>
<th></th>
<th>Daily gain during test/dnevni priраст tokom ispitivanja (g)</th>
<th>Side fat Thickness/Debljina bočne slanine (mm)</th>
<th>Input of feed/ kg body weight/converzija hrane (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>German Landrace/Nemački landras</td>
<td>972</td>
<td>11,5</td>
<td>2.27</td>
</tr>
<tr>
<td>Large White/Velika bela</td>
<td>1000</td>
<td>11,6</td>
<td>2.23</td>
</tr>
<tr>
<td>Pietrain/Pietren</td>
<td>868</td>
<td>8,0</td>
<td>2.17</td>
</tr>
</tbody>
</table>

For pig production in farms the results of female and castrated male pigs are important. Table 4 demonstrates a high genetic potential too, which is realised in performance evaluation of siblings and off springs.

Crossbred pigs in genetic composition Pietrain x (Large White x Landrace) realised the most important development in daily gain with 830 g and only 2,49 kg feed input for one kg body weight.

In conclusion of tables 2 to 4 generally a high genetic potential in reproduction and fattening performance and also in carcass evaluation can be confirmed.

A special important part is the meat quality. In German practical utilisation doesn’t include meat quality, because in commercial slaughterhouses meat quality is not registered generally. Therefore in Germany is no influence on price for carcass. In good
meat quality programmes boars that are susceptible to stress are excluded from breeding programme. And there is not an individually payment for good and for bad meat quality. In case of using of mixed genetic boars (NP) it could be used in practical slaughterhouses.

Table 4. Results after examination of finishing pigs in test station (ZDS, 2000)

<table>
<thead>
<tr>
<th></th>
<th>1991</th>
<th>1995</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gain/</td>
<td>Input of feed/</td>
<td>Gain/</td>
</tr>
<tr>
<td></td>
<td>prirast</td>
<td>kg body weight/</td>
<td>prirast</td>
</tr>
<tr>
<td></td>
<td>(g)</td>
<td>konverzija hrane (kg)</td>
<td>(g)</td>
</tr>
<tr>
<td>German Landrace/ Nemački landras</td>
<td>833</td>
<td>2.79</td>
<td>869</td>
</tr>
<tr>
<td>Large White/ Velika bela</td>
<td>834</td>
<td>2.91</td>
<td>853</td>
</tr>
<tr>
<td>Pietrain/ Pietren</td>
<td>729</td>
<td>2.54</td>
<td>721</td>
</tr>
<tr>
<td>PI x (LWxLR)</td>
<td>776</td>
<td>2.48</td>
<td>760</td>
</tr>
</tbody>
</table>

In Germany it's a drawback, that in front of the background of only limited profit increase by better carcass quality the really best slaughtered pigs are not able to honour. In the other hand, this would be an important stimulation for farmers to prefer only boars with high genetic potential in good meat quality (NN). Therefore, most important pig producing countries only use races without genetical risk for stress and bad meat quality. Exclusively breeding selection for high amount of lean meat in carcass produces pigs with a lower feed intake, a lower daily gain, with more sensitiveness for stress and with more animal losses. The profit goes down.

From the viewpoint of animal protection more consumers feel offensively. This provokes damage to one's image of pork. This is very important for modern strategies in pig breeding programmes.

In a special investigation Brand (2000) evaluated carcass and meat quality of several pure and crossbred pigs (table 5).

Under German marketing condition the Pietrain-boar (PP) with the highest share of lean meat but also with the highest share of PSE - meat realised the best price. In this case it is necessary to know in Germany pigs are slaughtered with a high body weight, about 112-119 kg live weight. In countries where are lower body weights after finishing the Duroc boar is used successfully. In this case higher daily gain, better meat quality and a high share of lean meat in carcass is able to realise, because fat growth begins in Duroc descendants earlier than in descendants of Pietrain boars. Denmark offers the best results with Duroc boars.
Table 5. Influence of genetic on meat quality and share of lean meat in pigs (BRAND 2000)

<table>
<thead>
<tr>
<th>Genetic/genetika</th>
<th>pH</th>
<th>Share of PSE/ Udeo PSE mesa -%</th>
<th>Share of lean meat/udeo mesa -%</th>
<th>Daily gain/ dnevni prirast (net)-g</th>
<th>price/pig cena/prase DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pi (NN)</td>
<td>6,18</td>
<td>2,1</td>
<td>55,6</td>
<td>468</td>
<td>182,86</td>
</tr>
<tr>
<td>Pi (PP)</td>
<td>5,76</td>
<td>21,8</td>
<td>56,1</td>
<td>472</td>
<td>184,82</td>
</tr>
<tr>
<td>Pi x Ha (NN)</td>
<td>6,19</td>
<td>1,4</td>
<td>54,5</td>
<td>480</td>
<td>177,50</td>
</tr>
<tr>
<td>Pi x Ha (NP)</td>
<td>5,97</td>
<td>10,2</td>
<td>54,9</td>
<td>471</td>
<td>173,02</td>
</tr>
<tr>
<td>Du (NN)</td>
<td>6,26</td>
<td>1,9</td>
<td>53,8</td>
<td>496</td>
<td>173,02</td>
</tr>
<tr>
<td>Ha x Du (NN)</td>
<td>6,26</td>
<td>1,5</td>
<td>54,3</td>
<td>488</td>
<td>176,23</td>
</tr>
</tbody>
</table>

For the economy of piglet production the reproduction performance is the most important feature. Köhn (1997) demonstrates clearly the influence of special features on profit in pig production (table 6).

Table 6. Influence of special features on profit in pig production* (KÖHN, 1997)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Change/ Promena</th>
<th>Change of profit/profit DM/piglet/prase</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remountation of herd</td>
<td>5 %</td>
<td>0.31</td>
<td>2.5</td>
</tr>
<tr>
<td>Remont stada</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs per gilt</td>
<td>50 DM</td>
<td>1.10</td>
<td>8.9</td>
</tr>
<tr>
<td>Troskovi po nazimici</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of piglets/sow</td>
<td>1 piglet</td>
<td>3.93</td>
<td>29.4</td>
</tr>
<tr>
<td>Broj prasadi po krmaci</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price per piglet</td>
<td>5 DM</td>
<td>5.00</td>
<td>40.4</td>
</tr>
<tr>
<td>Cena po prasetu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work hours/sow and year</td>
<td>1,0</td>
<td>0.90</td>
<td>7.3</td>
</tr>
<tr>
<td>Radni sati po krmaci godišnje</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs/work hours</td>
<td>1,- DM</td>
<td>0.75</td>
<td>6.1</td>
</tr>
<tr>
<td>Cena radnog sata</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Base for calculation/baza za izračunavanje:
cost/place for one sow:
troškovi za jednu krmacu: 4500 DM
number of weaned piglets/sow and year: 20
broj odlučene prasadi po krmacu godišnje: 80 DM
cena praseta: 15
work hours/sow and year: 25
DM/work hour: 450 DM
price for gilt: cena nazimice
remountation of herd: remont stada: 40 %
Currently two features are most important for profit in pig production. The price per piglet influences the profit about 40%. It depends on many influences outside of farmer’s possibilities. Therefore the farmer can manipulate the price per piglet only until a certain degree. In the other side the farm management mostly influences the number of piglets per sow. It influences the profit by nearly 30%.

Besides the “Return of Investment” is able to check the system for economy. It depends on following situation: Is it a new built or reconstructed stable. In a new built stable for 720 sows the “Return of Investment” was investigated between 21 and 27 weaned piglets (Lorenz, 1998). Only when more than 25 piglets per sow and year are sold, the Breakeven for production is lower than 68 DM and for profit lower than 89 DM (picture 1):

In conclusion of them reproduction performance is the major feature for effective pig production today. In front of the background of low heritability for marks of reproduction performance, it is essential to organise optimal environments in pig farms to exhaust high genetic potential. Currently some important characteristics of new phenotypes in pigs are important, they characterise the modern pig population (table 7):

Table 7. Genetical and phenotypic development in pigs
Table 7. Genetski i fenotipski razvoj svinja

<table>
<thead>
<tr>
<th>Feature/osobina</th>
<th>Development since 1985/razvoj od 1985.god.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body weight/telesna masa:</strong></td>
<td></td>
</tr>
<tr>
<td>Gilts/nazimice</td>
<td>115 → 130 kg</td>
</tr>
<tr>
<td>Sows/krmace</td>
<td>200 → 250 kg</td>
</tr>
<tr>
<td>Newborn piglet/novorodena prasad</td>
<td>1200 → 1400 g</td>
</tr>
<tr>
<td>Piglet 3 weeks old/prasad u uzrastu od 3 nedelje</td>
<td>4000 → 6000 g</td>
</tr>
<tr>
<td><strong>Reproduction performance/reproduktivni rezultati</strong></td>
<td></td>
</tr>
<tr>
<td>Live born piglets/litter</td>
<td>12 → 14.5</td>
</tr>
<tr>
<td>živorodena prasad po leglu</td>
<td></td>
</tr>
<tr>
<td>Weaned piglets/litter</td>
<td>9.5 → 11.5</td>
</tr>
<tr>
<td>odbijena prasad po leglu</td>
<td></td>
</tr>
<tr>
<td><strong>Feed intake of lactating sow/d</strong></td>
<td>5 → 6 8 kg</td>
</tr>
</tbody>
</table>

Konzumiranje hrane krmača u laktaciji, dnevno

The fast genetic progress indicates new aims in piglet production in near future. French pig industry demonstrates, 27,0 weaned piglets per sow and year and 26.5 finished pigs per sow and year are possible. These high aims require perfect management in all details of pig production:
- housing and feeding conditions
- reproduction management
- suckling and
- hygienical management
**Production management**

Generally it is essential to organise a clear farrowing system with artificial insemination (AI). The possibilities to use zoo- and biotechnical methods for manipulation of oestrus in gilts and sows are different (picture 2).

A few methods, which include zoo and biotechnical treatments with different share, are recommendable. But all methods are based on good zootechnical conditions like body condition, contact to other pigs, or other factors like feeding, special stress for stimulation of oestrus and so on.

Rearing performance in sows depends on complex endogenous and exogenous influences during pregnancy and lactation. During pregnancy especially nutrition situation is important for quality of litters and newborn piglets (picture 3).

In the other hand in lactation the high level of nutrition is also the most important prerequisite for good breeding conditions of sows as well as for daily gains of piglets health and animal losses.

In last years a lot of farms for piglet production prefer short lactation times.

In front of the aim to produce so many piglets as possible, one opportunity is a short lactation but without negative influences for reproduction performance of sows (picture 4).


In the other hand a lot of scientific papers demonstrate the advantage of short suckling period for health of piglets and following for high healthy status in pig production (picture 5).

This system is called “Multisided production” and requires the production in segregated places. The piglets couldn't contact with special diseases. The passive immunisation is realised by colostrums. In piglet production farm a consistent "All in - all out" system is essential for a good hygienical status. After weaning it is essential to realise a consistent “All in – all out” – system in piglet rearing and in finishing too. The reason of these systems is the effective interruption of pathogen lines.

It is essential, in the time after weaning young pigs never should contact with new, pathogens that are unknown for piglets until this time. In table 8 some results are demonstrated in groups after segregated weaning and in groups without them.

The amount of animals with lung diseases (Pneumonia) was significant higher in control group without segregated weaning. For economy it was important, pigs after segregated weaning realised significant higher daily gain. But in following of them the percentage of body fat was higher and the percentage of lean meat was reduced. Generally following conclusions are possible:

- A high health status supports a high performance in growth.
This is an important prerequisite for high daily gain and earlier slaughtering.

It is well known, an increase of daily gain in finishing about 100 g with 2% higher share of lean meat in carcass is possible by using of multisided production with consistent segregated production places for pregnant and lactating sows, for weaned piglets and for fattening pigs. This higher performance corresponds to 1.5 standard variation (s) of these features and that’s tantamount to breeding time of 10 generations (KRAPOTH, 1998). This demonstrates clearly, with a perfect environment management it is possible to stimulate the genetic capacity in farm animals effectively.

Table 8. Influences of diseases on traits of carcass after segregated rearing and finishing of pigs (HÖRÜGEL, 1998)

<table>
<thead>
<tr>
<th></th>
<th>Weaning with 20 day</th>
<th>Start of finishing with 75 day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experiment</td>
<td>Control</td>
</tr>
<tr>
<td></td>
<td>Ogređ</td>
<td>Kontrola</td>
</tr>
<tr>
<td>n</td>
<td>60</td>
<td>62</td>
</tr>
<tr>
<td>Carcass diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnose za trupa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lungs negative (%)</td>
<td>98.3</td>
<td>9.7</td>
</tr>
<tr>
<td>Performances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proizvodni rezultati</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily gain total (g)</td>
<td>646</td>
<td>554</td>
</tr>
<tr>
<td>Daily gain in finishing (g)</td>
<td>808</td>
<td>644</td>
</tr>
<tr>
<td>Lean meat (%)</td>
<td>53.3</td>
<td>55.1</td>
</tr>
</tbody>
</table>

For conclusion three points are important:

- It’s important to breed pigs with maximum daily gain of lean meat.
- Pigs should be able to intake high concentrated feed without restrictions.
- The growth of lean meat has to keep for a long time and the growth of fat has to begin as later as possible. Following the percentage of lean meat in carcass should be between 58 and 60%. This situation requires uniform carcasses. The producer has to select the finished pigs carefully for uniform groups of pigs with the same optimal body weight before the pigs leave the farm. A high variation in body weight reduces the profit.

Meat industry and pig producers are interested in stable meat consumption. Both have to keep it in a high level. Therefore producers have to select all identifiable causes for stress in breeding and production systems consequently. It is essential to realise a transparent production management. This requires explaining with new conditions for pig production in Europe like the prohibition of antibiotics for stimulation of performance or a new pig housing decree.
Conclusion

The most important current problems and tendencies in European pig industry are following:

- In the average the number of sows per farm is going on to increase.
- The costs for feed can go on to decrease with a lower variation.
- Although the body weight of sold piglets will be increased. The profit for each piglet can be reduced because lower prices. This requires a higher daily gain and higher body weight of finished pigs with reduced animal losses.
- In reproduction it is essential to increase the number of weaned piglets per sow and year drastically.
- For economical situation only the profit in piglet production can going to increase slowly if a higher number of weaned piglets per sow and year can be realised.
- For finishing of pigs it is difficult to make a prognosis of a higher profit next time.

Generally the guidelines for pig production are influenced by the trend on bigger farms - a higher sensitivity for consumer protection, only a low increased profit with higher amount of lean meat in carcass, but higher level in traits which are able to reduce costs. This includes on optimal environment and excellent healthy conditions.

SADAŠNJI PROBLEMI I TENDENCIJE U RAZVOJU PROIZVODNJE SVINJA

M. Wähner

Rezime

Tendencije u razvoju proizvodnje svinja su uslovili ne samo Nemačku već i druge evropske zemlje, kao i Severnu Ameriku da preispitaju svoje strategije odgoja i proizvodnje. U ovaj globalni proces uključena je i Jugoslavija.

Odredene prognoze koje se odnose na sadašnje tendencije u ovoj proizvodnoj grani su moguće samo ukoliko se razmotri razvoj u poslednjih deset godina. Analiza je fokusirana na poređenje određenih osobina koje se odnose na odgoj svinja i proizvodnih rezultata u isto vreme.

References

5. HÜHN, U. (1997.): Kurze Sängezeiten haben Tücken. - dlz, 10, pp. 70 - 73

Breakeven points of production and profits in piglet production (720 productive sows)
Tačke izjednačenja dobitaka i gubitka u proizvodnji prasadi (720 krmaca)

Number of piglets per sow and year
Broj prasadi po kramači godišnje
Current problems and tendencies of development in pig production

Length of lactation
Interval of Generation
Generacijski interval

Reproduction
Performance
Reproduktivni rezultati

Health of piglets and finishing pigs
Zdravstveno stanje prasadi i tovljenika

Reproduktivnl rezultst

Number of slaughtered pigs per sow & year
Broj zaklanih svinja po krmači godišnje

Picture 4: Importance of lactation for sow and piglets
Slika 4: Značaj laktacije za krmaču i prasad

Organization of pig production to keep a high healthy status
Organizacija svinjarske proizvodnje u cilju očuvanja dobrog zdravstvenog stanja životinja

Weaned sows/Odlučene krmače
Pregnant sows/Bremenite krmače
Sows in lactation/Krmače u laktaciji

Piglet rearing/Odgoj prasadi
Finishing/Tov

Weaned sows/Odlučene krmače
Pregnant sows/Bremenite krmače
Sows in lactation/Krmače u laktaciji

Piglet rearing/Odgoj prasadi
Finishing/Tov
Manipulation of oestrus cycle in pigs

Biotechnical methods for synchronization of oestrus and ovulation

Biotchnicke metode za sinhronizaciju cestrusa i ovulaciju

Body weight & condition

stress of parturition

Resort hormonalka, materija

Hereditary disease

Manipulation of oestrous cycle in pigs

Endogenous and exogenous influences on rearing performance in sows

Endogene i egzogene uticuji na rezultate u odgoju svinja

Genetic (lent'ski sistemi)

Zoo & biotechnical systems

Zoo i biotehnalski sistemi

Nutrition

Ishrana

with milk and feed (mlkom i hranom)

Endogenous and exogenous influences on rearing performance in sows

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Endogene i egzogene uticuji na rezultate u odgoju svinja

Genetic (lent'ski sistemi)

Zoo & biotechnical systems

Zoo i biotehnalski sistemi

Nutrition

Ishrana

with milk and feed (mlkom i hranom)