

Growth of Krškopolje piglets during lactation and first rearing period

Tomažin, U.¹; Batorek Lukač, N.¹; Škrlep, M.¹; Prevolnik Povše, M.^{1,2}; Mežan, A.³ and Čandek-Potokar, M.^{1,2*}

¹Agricultural Institute of Slovenia. Ljubljana. Slovenia.

²University of Maribor, Faculty of Agriculture and Life Sciences. Maribor. Slovenia.

³Chamber of Agriculture and Forestry of Slovenia – Unit Novo mesto. Novo mesto. Slovenia.

ADDITIONAL KEYWORDS

Krškopolje breed growth rate.
Pre- and post-weaning growth.

SUMMARY

The only Slovenian autochthonous pig breed (Krškopolje) is reared in very diverse conditions resulting in variable growth rates. As literature data on this breed is scarce, different growth phases were assessed within the TREASURE project. Growth in the pre-weaning period (n=156) was recorded on the farms of their origin (7 organic and 11 conventional), whereas the post-weaning period data originated from a subsample (n=42; piglets from 5 organic and 9 conventional farms). transferred to the experimental farm. There the piglets were assigned within litter to three pens; one pen (ECO; n=14) received organic feed mixture (12.8 MJ metabolizable energy, 17% crude proteins), while two pens (CON, n=28) received a conventional starter for 10 days (14 MJ metabolizable energy, 17.8% crude proteins) and thereafter a grower diet (13.6 MJ metabolizable energy, 16.8% crude proteins). Piglets were fed *ad libitum* and weighed at the average age of 38, 54 and 113 days. Prior to weaning, the piglets grew faster on conventional (app. 20%) than on organic farms (209±16 vs. 173±19 g/day, respectively), but the difference was not significant (P=0.17). Post-weaning, CON group had only 8% higher daily gain than ECO (391±31 vs. 361±41 g/day, respectively; P=0.60). The results suggest that no differences in between the systems are expected within similar rearing and feeding conditions.

Crescimento de leitões Krškopolje nos períodos pré e pós desmame

RESUMO

A única raça autóctone suína da Eslovénia (Krškopolje) é produzida em condições muito diversas, que se traduzem por ritmos de crescimento também variáveis. Dado que a literatura nesta raça é escassa, foram estudados no projeto TREASURE várias fases de crescimento destes suínos. O crescimento pré-desmame (n=156) foi registado nas suas explorações de origem (7 orgânicas e 11 convencionais) e o crescimento pós-desmame (recria) foi estudado usando uma sub-amostra (n=42; leitões de 5 explorações orgânicas e 9 convencionais) de leitões transferidos para a estação experimental. Nesta, os leitões foram distribuídos por 3 parques: um parque ECO (n=14) onde foi fornecido um alimento composto orgânico (12.8 MJ de energia metabolizável, EM; 17% de proteína bruta, PB) e 2 parques (CON, n=28) onde se forneceu um alimento de iniciação convencional durante 10 dias (14 MJ EM; 17,8% PB) seguido de um alimento de crescimento (13,6 MJ EM; 16,8% PB). Os leitões foram alimentados *ad libitum* e pesados com uma idade média de 38, 54 e 113 dias. Antes do desmame os leitões das explorações convencionais cresceram mais rapidamente (cerca de 20%) que os das explorações orgânicas (209±16 vs 173±19 g/dia, respetivamente) embora essa diferença não fosse significativa (P=0,17). No período pós-desmame, o grupo CON apresentou um ganho médio diário apenas 8% maior que o grupo ECO (391±31 vs 361±41 g/dia, respetivamente, P=0,60). Estes resultados sugerem que não são de esperar diferenças entre sistemas de produção quando consideradas condições de produção e de alimentação similares.

PALAVRAS CHAVE ADICIONAIS

Ritmo de crescimento de leitões Krškopolje.
Crescimento pré e pós-desmame.

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Correspondencia a los autores/Contact e-mail:

meta.candek-potokar@kis.si

INTRODUCTION

Krškopolje pig is the only Slovenian autochthonous pig breed which is reared in very diverse conditions. Most of the farmers rear these pigs in extensive conditions, often using a combination of indoor and outdoor systems. On the other hand, some farmers are also using more intensive farming. Breeders value Krškopolje pigs for their peaceful behaviour and their ability to adapt to poorer rearing conditions. Therefore,

most of the small scale farmers feed these pigs with diverse feeding sources, besides grains also with forages and cooked root crops. This pig breed is appreciated for its high quality meat which is due to higher fat content especially suitable for processing into dry-cured meat products. These claims are mainly based on of the breeder's experiences, whereas the scientific information on production traits of Krškopolje pig breed is very scarce. Furthermore, the research was performed in very diverse rearing and feeding condi-

tions resulting in relatively high variability reported for daily gain from birth to slaughter (Kastelic 2001, p. 34; Čandek-Potokar et al. 2003, p. 123) or growth rates during the lactation period (Kovač & Flisar 2015, p. 137). On the basis of the aforementioned studies it is also difficult to define the growth potential and nutritional needs of this local pig breed, therefore, piglets with variable genetic background housed in similar conditions were used in the present study. Additionally, an effect of conventional *vs.* organic feeding regime was evaluated.

MATERIAL AND METHODS

Growth of Krškopolje piglets in lactation period (until weaning) was recorded on 18 breeding farms all over Slovenia. One hundred fifty-six piglets (68 females and 88 castrates) were weighed on the farms of their origin (7 organic and 11 conventional farms) at the age of four to six weeks (on average at 38 days). Litter size (piglets born alive) averaged 10.5 piglets/litter (in the range of 8 to 11) and 9.7 (in the range of 7 to 14) on conventional and organic farms, respectively. In order to calculate daily gain of the piglets, their birth weight was estimated at 1.2 kg. For the purpose of monitoring growth of piglets in the post-weaning period, a subsample of 42 piglets (three castrates per litter) was selected from five organic and nine conventional farms. The selection was performed according to their weight, in such way that the highest similarity between farms and production system was reached. The piglets were housed at experimental farm at the average age of 54 days. One piglet per litter was assigned to each of the three pens. Piglets in one pen (ECO, n=14) received commercially available organic feed mixture (**Table I**), while piglets in two pens (CON, n=28) received initially a conventional starter, which was fed for 10 days and thereafter a conventional grower diet (**Table I**). Piglets were fed on *ad libitum* basis and were weighed at the average age of 54 and 113 days. Four piglets were lost during the experiment due to health problems.

Data was analysed using the MIXED procedure (SAS Institute Inc, Cary, USA). For the statistical analysis of the data obtained in the pre-weaning period a fixed effect of production system (organic *vs.* conventional) and a random effect of the farm nested within the production system were included. For the post-weaning period, feeding regime as fixed and a pen nested within the feeding regime as a random effect were used. All presented values are least-square means \pm standard error of mean (LSMEAN \pm SEM).

RESULTS

At weaning, the piglets raised on conventional farms were approximately 20% heavier (**Table II**), which reflects their higher daily gains. However, the difference was not significant when taking into account the random effect of farm ($P=0.17$). The weights of the piglets at weighing were very variable, with minimum values being 2.0 and 3.0 kg, and maximum values being 13.0 and 13.8 kg in organic and conventional farms, respectively. In the post-weaning period, when all piglets were reared at the same farm, the piglets fed conventional feed had 8% higher daily gains than piglets receiving organic diet (**Table III**), again, the differences were not significant ($P=0.60$).

DISCUSSION

Although not statistically significant, growth rates of piglets raised on organic farms were lower than of piglets raised on conventional ones. Such results are expected in Slovenian pig farming conditions because of the regulations (Council Regulation (EC) No 834/2008) not allowing the use of synthetic amino acids, genetically modified organisms and feed materials processed with the aid of chemically synthesised solvents. The latter two are particularly referring to soybean meal, which is one of the main protein sources used in conventional feed for pigs. As most of the Krškopolje pigs are reared on small scale farms, there are often no main differences between conventionally and organically raised pigs, explaining the small differences (statistically insignificant) between growth rates in lactation period between the two farming systems. Considering the post-weaning period, a study by Millet et al. (2004, p. 116) illustrated that conventionally fed modern crossbred pigs show better growth in comparison to organically fed pigs in first phase of fattening. However, a study of Brandt et al. (2010, p. 539) showed that local breeds did not suffer as much from reduced protein and energy levels in organic diet as did the modern highly selected breeds. The only available literature data on Krškopolje pigs show daily gain from birth to slaughter at 132 kg of pigs fed feed mixture based on maize, barley and soybean meal was 637 g (Kastelic 2001, p. 34), while daily gains of pigs fed commercial feed mixture (11.8 MJ ME) and maize grain silage in a study published by Čandek-Potokar et al. (2003, p. 123) were estimated at 509 g. In lactation period, growth rates of Krškopolje piglets recorded in three distinct trials, where the piglets were weaned at

Table I. Composition of feed mixtures (Composição dos alimentos compostos).

	Organic starter diet ¹	Conventional starter diet ²	Conventional grower diet ³
Metabolizable energy (MJ/kg)	12.8	14	13.6
Crude protein (%)	17	17.8	16.8
Crude fat (%)	4.5	4.2	4.2
Crude fibre (%)	4	2.9	3.8
Lysine (%)	0.8	1.3	1.0

¹Alpenkorn Ferkel, Unser Lagerhaus, Klagenfurt, Austria; ²PU-starter-premium; Jata Emona, d.o.o., Ljubljana, Slovenia; ³PU-grower-premium; Jata Emona, d.o.o., Ljubljana, Slovenia.

Table II. Growth rates of Krškopolje piglets during nursing period (LSMEAN \pm SEM) (Ritmo de crescimento dos leitões Krškopolje durante o período de cria).

Origin	Organic	Conventional	p-value
No. of piglets	56	100	
Weight at 38 days, kg	7.7 \pm 0.7	9.1 \pm 0.6	0.1505
Daily gain, g/day	173 \pm 19	209 \pm 16	0.1662

Table III. Growth rates of Krškopolje piglets in the post-weaning period (LSMEAN \pm SEM) (Ritmo de crescimento dos leitões Krškopolje no período pós-desmame).

Group	ECO	CON	p-value
No. of piglets	12	26	
Weight at 54 days, kg	14.5 \pm 0.9	13.4 \pm 0.7	0.3727
Weight at 113 days, kg	35.6 \pm 2.9	35.8 \pm 2.2	0.9602
Daily gain (38-113 days), g/day	362 \pm 41	391 \pm 31	0.6033

59, 58 or 55 days, were 235, 331 in 183 g/day, respectively (Kovač & Flisar 2015, p. 137). In our study, there were no differences between conventionally and organically fed Krškopolje piglets, suggesting that no differences in growth rates of this autochthonous pig breed between organic and conventional system are expected in the case of similar rearing and feeding conditions.

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