Archivos de Zootecnia
Journal website: https://www.uco.es/ucopress/az/index.php/az/
POSTER

First reproductive and productive results on Ribatejano pig

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Additional keywords

Litter size.
Piglets.
Colostrum intake.
Mortality rate.
Average daily gain.

SUMMARY

This trail aimed to study the effect of crossbreeding between Alentejano (AL) and Bísaro (BI) swine breeds (Ribatejano pig) on some reproductive and productive traits. Nine AL gilts and sows and six BI gilts were crossed with BI and AL boars, respectively. Mating and farrowing dates, and litter size at farrowing and 28d were registered. The pregnancy length was shorter on AL sows (111±0.4d vs 113.7±0.5d; P=0.002). The BI gilts presented higher prolificacy rate than AL on both total born (11.0±1.0 vs 6.7±0.8; P=0.004) and born alive piglets (10.0±1.0 vs 6.7±0.8; P=0.026). The mortality rate was similar in both genotypes (P=0.255) being on average 12%. At 28d after farrowing the litter size remained higher in BI sows (8.5±0.8 vs 6.1±0.6; P= 0.032). A subset of each genotype (4 gilts) was supervised during farrowing and lactation (until 28d) and piglets were weighed at birth, 24h and 28d of life. Farrowing length was not significantly different (P=0.253) between genotypes, averaging 97±22 min. When compared to ALBI (ALxBI) piglets, the BIAL (BIxAL) piglets were heavier at birth (1402±46g vs 1209±36g; P=0.002). Colostrum intake of piglets per kg of birth weight on the first 24h of life was similar between genotypes (P=0.735) being 289±15g for ALBI and 281±19g for BIAL piglets. The growth rate of piglets from birth to 28d and piglet weight at 28d were not different between genotypes (P=0.161 and P=0.091) averaging 195±6g and 6761±181g, respectively. Litter weight at 28d tended (P=0.058) to be higher on ALBI litters (56.6±4.0kg) than BIAL litters (43.2±4.0kg). These results obtained within the frame of Treasure project are the first data available so far from this cross and it could be useful in future as reference for further studies and also for farmers that may try these crosses on a commercial basis.

Primeiros resultados reprodutivos e produtivos do porco Ribatejano

Palavras chave adicionais

Tamanho ninhada.
Leitões.
Ingestão de colostro.
Taxa de mortalidade.
Ganho médio diário.

RESUMO

Este trabalho pretendeu estudar comparativamente, parâmetros reprodutivos e produtivos das raças suínas Bísara (BI) e Alentejana (AL) utilizadas em cruzamento recíproco para a obtenção do *porco Ribatejano*. Nove porcas e marrãs AL e seis marrãs BI foram cobertas por varrascos BI e AL, respetivamente. Registaram-se as datas de cobrição e parto e os tamanhos da ninhada ao parto e aos 28 dias. As fêmeas AL apresentaram uma gestação mais curta (111±0,4d vs 113,7±0,5d; P=0,002). As fêmeas BI apresentaram ninhadas maiores quer em nascidos totais (11,0±1,0 vs 6,7±0,8; P=0,004), quer em nascidos vivos (10,0±1,0 vs 6,7±0,8; P=0,026). A mortalidade até ao desmame não foi diferente entre genótipos (P=0,255) apresentando uma taxa média de 12%. Aos 28d as ninhadas das fêmeas BI permaneciam maiores (8,5±0,8 vs 6,1±0,6; P=0,032). Em 4 marrãs de cada genótipo foram acompanhados o parto e a lactação até aos 28d, pesando-se os leitões ao nascimento, às 24h e aos 28d. O parto teve uma duração média de 97±22min, não sendo diferente entre genótipos (P=0,253). Quando comparados com os leitões ALBI (ALxBI), os leitões BIAL (BIxAL) pesavam mais ao nascimento (1402±46g vs 1209±36g; P=0,002). A ingestão de colostro por kg de peso vivo nas primeiras 24h foi similar entre genótipos (P=0,735), apresentando um valor de 289±15g para os leitões ALBI e de 281±19g para os leitões BIAL. O ganho médio diário até aos 28 dias e o peso dos leitões a essa idade não foi diferente entre genótipos (P=0.161 e P=0.091), e apresentaram valores médios de 195±6g e 6761±181g, respetivamente. O peso da ninhada aos 28 dias tendeu a ser maior (P=0,058) em ninhadas ALBI (56,6±4,0kg) quando comparadas com as ninhadas BIAL (43,2±4,0kg). Estes resultados, obtidos no âmbito do projeto europeu Treasure são, aparentemente, os primeiros registos acerca deste cruzamento e poderão ser usados no futuro como referência para estudos e para criadores que equacionem fazer este cruzamento para uma utilização comercial.

Information

Cronología del artículo.
Recibido/Received: 15.02.2017
Aceptado/Accepted: 30.06.2017
On-line: 15.01.2018
Correspondencia a los autores/Contact e-mail:
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INTRODUCTION

Alentejano (AL) and Bísaro (BI) swine breeds are the most representative autochthonous pig breeds in Portugal. The Alentejano is an Iberian type breed (Porter 1993) mostly raised at the South of Portugal, while Bísaro is a Celtic type breed (Porter 1993) typically raised at the North of Portugal, and like the AL breed it was not submitted to genetic improvement programs (Gama et al. 2013). In the first half of last

century these breeds were the main pig populations in Portugal, and according to ancient testimonies (Miranda do Vale 1949), in the contact zones, like in Ribatejo, the cross between both breeds was a common practice, and the result (animal, meat and products) was rather appreciated. However, no scientific data is available regarding these crossbred animals. In the framework of the European project TREASURE, the University of Évora team proposed to scientifically study the cross between these two breeds, that were called "Ribatejano Pig", in order to access the eventual interest of these animals both for local pig breed farmers, industry and consumers. This work focus on some reproductive and productive traits of pure breed females and crossbred piglets during the nursing period.

MATERIAL AND METHODS

Animals

All AL and BI reproducers were pure breed and registered in the herd book of each breed. A total of 9 AL females (4 gilts and 5 sows) and 6 BI gilts were mated by 3 BI and 3 AL boars, respectively, in a controlled crossbred protocol. The choice of each cross was random but each female only mated with one boar (2-3 matings during oestrus period, separated by 24h period). Pregnancy was checked by ultrasonography at ±25d after mating. The cross between AL male and BI female produced ALBI piglets, while the cross between BI male and AL female produced BIAL piglets.

Animal management

AL females remained for the gestation period in an outdoor park while BI remained at indoor facilities (2-3 females per park). This procedure was chosen due to the breed adaptation for each facility type and also because of the potential difficulties for BI females to carry out pregnancy in the hot climate of Alentejo region during summer time. About two weeks before the previewed farrowing date, AL gilts (n=4) were moved to the indoor facilities (in identical conditions of BI, grouped housed, 2-3 females per park). Finally, 5-6 days before the previewed farrowing date, gilts (4 AL and 6 BI) were moved to the maternity facility, in individual standard farrowing crates and remained there until 28d after farrowing.

Farrowing supervision and data collection

At first farrowing signs, gilts were supervised in as less disturbing way as possible. Due to the absence of farrowing signs visualization during night parturitions, the correct collection of farrowing (duration) and newborn data (birth weight) was only possible on 4 AL and 4 BI gilts. After birth, each piglet was roughly dried, individually identified (ear tag), an umbilical clamp was placed at about 5-6 cm from the belly and the umbilical cord was cut. The remain umbilical cord and clamp were then disinfected using an iodine based disinfectant. These procedures were rapid, taking on average 1-2 minutes, after which the piglet was placed near the mother, close to the mammary glands. All piglets were re-weighed at 24h and weekly until 28 days of age. All deaths were daily registered and dead piglets were weighed, but not necropsied.

Calculations

The gestation length was considered as the time between the first mating and parturition. The farrowing duration was recorded between first and last born piglet. The individual colostrum intake was estimated using Devillers et al. (2004) equation that uses piglet weight at birth, at 24h and time between birth and first colostrum intake (not measured, a 15min period was considered) to estimate colostrum intake. The colostrum production by the sows was the sum of individual colostrum intakes of her litter. No cross-fostering was made before 24h. Afterwards only one BIAL and one ALBI piglet were cross-fostered between gilts (remaining in the same genotype litter type) and these piglets were not considered for growth performance.

Statistical analysis

Statistical analysis was performed with the statistical software IBM SPSS Statistics software (v.21, 2012). Results are presented as mean ± SEM. Statistical analysis was performed by one-way analysis of variance (ANOVA) using genotype as fixed effect. For colostrum production, a covariance analysis was performed using litter weight as covariate. Differences were considered significant when $P<0.05$.

RESULTS AND DISCUSSION

Table I. Reproductive and productive traits of Alentejano (AL) and Bísaro (BI) females (Parâmetros reprodutivos e produtivos de fêmeas Alentejanas (AL) e Bísaras (BI)).

	AL		BI		P-value
	Mean	SE	Mean	SE	
Gestation length (days)	111	0.4	114	0.5	0.002
Total born	6.7	0.8	11.0	1.0	0.004
Born alive	6.7	0.8	10.0	1.0	0.026
Mortality rate (%)	8.3	-	15.0	-	NS
Litter size at 28 days	6.1	0.6	8.5	0.8	0.032

NS: P≥0.05

Table II. Traits and performance of BIAL and ALBI piglets (Caracterização e performance de leitões BIAL e ALBI).

	BIAL		ALBI		P-value
	Mean	SEM	Mean	SEM	
Born alive	6.3	1.2	10.3	1.2	0.059
Birth weight (BW, g)	1402	46	1209	36	0.002
Colostrum intake 24h g/kg BW	281	19	289	15	NS
Average daily gain: Birth -28d (g)	205	9	188	7	NS
Litter size at 28 d	6.0	0.7	8.8	7.0	0.037
Mean weight at 28d	7.1	0.3	6.5	0.2	NS
Litter weight at 28 days	43.2	4.0	56.6	4.0	0.058

NS: P≥0.05

The reproductive results observed in AL and BI females are presented in **Table I**. AL females had shorter gestations and lower litter size than BI females. Gestation length values are in agreement with the observations by Charneca et al. (2012) and Outor-Monteiro et al. (1998) for each breed and confirms the shorter gestation period on AL sows, when compared to Celtic branch breeds or related genotypes. The litter sizes of AL females, both on total born and born alive, are slightly lower than the reported values for the breed by Charneca et al. (2012) probably due to the higher percentage of gilts (almost 50%) in the present study when compared to the cited study. As previously observed in the same breed (Nunes 1993) the litter size of gilts is lower than that observed in multiparous females (2-5 parity sows). Regarding BI gilts, both values are higher than the reported by Outor-Monteiro et al. (1998) and Santos e Silva (2006) when compared with those observed in gilts, and even when compared to those observed in sows. These differences could be related to boar exposure, permanent since first estrus in the present study. All values on litter size confirm the AL breed as a low prolific breed whereas BI can be classified as a medium prolific breed considering the intermediary values observed in this breed and those reported for genetic improved pure breeds like Large-White (Canario et al. 2007).

The results on the gilts of each breed and their piglets are presented in **Table II**. Born alive piglets tended to be more at birth and were more at 28d in BI sows. The crossbred BIAL piglets were heavier at birth than ALBI piglets, however their colostrum intake per kg of birth weight and average daily gain were not different until 28d of nursing period. The litter size was still higher at 28d in ALBI (BI) litters, however the mean individual weight at that age was no longer different between genotypes. The BIAL piglets are heavier at birth and their growth rate is numerically higher than the observed in ALBI piglets, however the mean weight at 28d was no longer different between genotypes. This apparent contradiction may be explained by the death of the weaker piglets in ALBI litters (the mean weight of lost piglets was 1047g) during that period. The litter weight at 28d tended to be higher in ALBI litters because of their larger size. Colostrum production of AL gilts was lower than the observed in BI gilts (2294±228g vs 3672±228g; p=0.005) and remained lower even when adjusted to litter weight (which results from litter size and piglets' weights) being 2518±166g vs 3448±166g; p=0.015. This higher production explains why the individual colostrum intake was not different between genotypes despite the higher number of piglets nursing in BI gilts. This lower production of colostrum by AL females was also observed in previous studies, when compared to Large-White x Landrace sows (Charneca et al. 2015). The absolute values for colostrum production by AL gilts were comparable to the previously observed for the breed (Charneca et al. 2015) and the values for BI were similar to those observed in more selected genotypes (Quesnel et al. 2012) indicating the great capacity of this breed to nourish their litters.

The mortality rates in these litters were 9.2% in BIAL piglets and 15% in ALBI piglets. These mortality rates were not statistically different, most likely because of the low number of animals. The reported mortality rates for AL or Iberian piglets (Marques et al. 1996; Robledo et al. 2008 and Charneca et al. 2012) and for BI piglets (Outor-Monteiro et al. 1998; Santos e Silva et al. 2003) are higher, in most cases superior to 20%. The reasons for the low mortality rate in the present study may be related to a closer supervision during the lactation period, mainly during the first days post-farrowing and/or by a heterotic effect on the piglets' viability. In fact, in a study with crossbred Piétrain x Bísaro piglets, Santos e Silva (2006) observed a mortality rate of 14.3%, therefore comparable to our observations. Also, considering the colostrum intake as crucial to neonatal survival, in both cases the average colostrum intake per kg of birth weight was much higher than the 180g/kg BW indicated by Quesnel et al. (2012) to significantly reduce the mortality risk by the provision of sufficient energy and immunization to the newborn.

Despite the relatively low number of animals and therefore the need for additional studies to confirm some of the findings now reported, this work allowed to obtain the first scientific data regarding the crossbred piglets from the two main Portuguese autochthonous breeds, and adds information regarding the AL breed,

and also reports the first results on the colostrum production by BI females.

ACKOWLEGMENTS

This work has been made in the scope of Treasure project. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634476 (Project acronym: TREASURE). The content of this paper reflects only the author's view and the European Union Agency is not responsible for any use that may be made of the information it contains.

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