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in

De Pedro E.J. (ed.), Cabezas A.B. (ed.).
7th International Symposium on the Mediterranean Pig

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 101

2012
pages 219-223

Preliminary results of productivity of Gochu Asturcelta's breed in semi-extensive systems

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Abstract. The aim of this work was to carry out preliminary studies of productivity of Gochu Asturcelta´s breed in semiextensive systems. There were confirmed two different strategies of growing and fatteninig of an autochthonous endangered pig breed, following the recommendations given for Iberian pig. A total of 19 animals in 2008 and 22 in 2009 were tested. The first strategy used rearing feed *ad libitum* from the weaning, except a restriction to 2.5 kg $pig^{-1}day^{-1}$ in the last month. In other one, the rearing feed was replaced to five months postwean for other feed: growing *ad libitum* (from 5 to 8 months) and fattening to dose of 2-2.5 kg $pig^{-1}day^{-1}$. The finishing in both years was done with different proportions of non-transgenic cereals. There were no differences in the live weight curves of evolution in both cases, turning out to be a better feed conversion rate with the second strategy (5.1 *vs* 5.3). The results showed that it is interesting to shorten the initial period of supply *ad libitum* and to restrict later to 2-2.5 kg $pig^{-1}day^{-1}$, using feed mixtures with 3200 kcal of digestible energy/kg dry matter and 10-12% crude protein, similar to those of the Iberian pork. However, further work is needed to investigate the effects of feeding levels on growth and meat quality of Gochu Asturcelta pig.

Keywords. Celtic trunk – Local pig – Semi-extensive production – Management.

Résultats préliminaires de productivité de la race Gochu Asturcelta en systèmes semi-extensifs

Résumé. *On a contrasté deux différentes stratégies de croissance-engraissement de porcs de race autochtone Gochu Asturcelta en régime semi-extensif, en suivant les recommandations données pour le porc Ibérique. Dans le premier cas, on a utilisé exclusivement un aliment pour élevage* ad libitum *depuis le sevrage, sauf restriction à 2,5 kg/porc/jour dans le dernier mois. Dans l'autre, on a remplacé l'aliment d'élevage à cinq mois post-sevrage par d'autres aliments de croissance* ad libitum *(5 à 8 mois) et d´engraissement à raison de 2-2,5 kg/porc/jour (> 8 mois). Il n'y a pas eu de différences dans les courbes d'évolution du poids vif dans les deux cas, un meilleur indice de conversion étant obtenu avec la seconde stratégie (5,1 vs 5,3). Il est donc intéressant de raccourcir la période initiale d'alimentation* ad libitum *et de restreindre ensuite à 2-2,5 kg/porc/jour, en utilisant les recommandations pour croissance et engraissement du porc Ibérique (3200 kcal d'énergie digestible/kg de matière sèche et 10-12% de protéines brutes). Toutefois, des travaux supplémentaires sont nécessaires pour étudier les effets de ces niveaux d'alimentation sur la croissance et la qualité de la viande de porc Gochu Asturcelta pour déterminer le niveau optimal d'alimentation.*

Mots-clés. *Tronc celtique – Race locale – Production semi-extensive – Gestion.*

I – Introduction

The presence of swine breeding in Asturias (*Sus célticus)* finds its origin in the pre-Roman period (V century BC), (Álvarez Sevilla, 2001). In the 20th century socio-economic transformations in the agro-food system, intensification and industrialisation, variations in land use and massive utilisation of commercial breeds determined the decline of local breeds (Franci *et al., 2007)*. The National Register of this local breed was in 2007 (BOE no. 21 ; 24/01/2007) by the Pig Breeders Association (ACGA) at the request of the Spanish Ministry for Agriculture and Fisheries. According to Royo *et al.* (2007), autochthonous Gochu Asturcelta porcine race is genetically close to the current white pigs of Northern-Central Europe and diverge significantly

at nuclear loci with respect the Iberian pig. Nevertheless, the Celtic and Iberian pigs have in common their wildness. The above mentioned suggests that also it will present nutritive requirements more similar to those of the Iberian pork, which quantification was and continues being the aim of several researches. The adoption of recommendations for gestation, lactation and rearing feeds destined to Iberian pig was decisive in the process of recovery of the Gochu Asturcelta breed (López Bote *et al.,* 2000), in the returning to local pig production in Asturias and they were the crucial way to obtain optimal results, although their percentage of registration is still very low. The production structure is constituted by a very small number of traditional farmers that sell on farm their production. In this situation, it is necessary to confirm the effects of feeding and rearing with nutritional requirements for Iberian pork with the "montanera, recebo and cebo" systems as a model (Barea *et al.*, 2007; Nieto *et al*., 2009) on growth performance. The aim of this work was to carry out preliminary studies of productivity of Gochu Asturcelta´s breed in semi-extensive systems, following the recommendations given for Iberian pig and return to regional customs of Asturias.

II – Materials and methods

For two successive years, 2008 and 2009, different treatments of growth and fattening were established with animals obtained in the own core of multiplication of the SERIDA. The animals were proceeding in both cases of near births, which were allowing the adoption of an average to which recounting the later ages. In 2008, a total of 19 pigs were used (9 castrated males plus 10 females) and in 2009 a total of 22 animals were employed (11 castrated males plus 11 females). The weaning took place at 46 days in 2008 and at 57 days in 2009, with respective mean values of weight of 12.35 and 15.89 kg. Table 1 shows the different durations of growth and fattening periods during 2008 and 2009, as well as the doses of feed corresponding to each one. The principal difference takes root in that during 2009 the phase of growth with feed *ad libitum* was slow and the duration of fattening with restricted supply was increased. Additionally, in 2008 rearing feed was exclusively used, whereas, in 2009, it was replaced immediately with one ratio of growth and other one of fattening. Following the rules of the ACGA the feeding system for finishing period in both years was done with different proportions of non-transgenic cereals.

Table 1. Different targets of growth, fattening and finishing on 2008 and 2009 years

Period	Year 2008			Year 2009		
	Age interval (months)	Feed	Dose (kg pig^{-1}day^{-1})	Age interval (months)	Feed	Dose (kg pig^{-1}day^{-1})
Growing	1.5 - 7.5	Rearing	*Ad libitum*	1.5 - 6	Rearing	*Ad libitum*
Fattening	7.5 - 11.5	Rearing	2.5	6 - 10	Rearing	2
				10 - 12.5	Fattening	2.5
				vs		
				10 - 14.5	Fattening	2.5
Finishing	11.5 - 16 vs 18	Fatteninig	*Ad libitum*	12.5 - 14	Fattening	*Ad libitum*
				vs		
				14.5 - 16	Fattening	*Ad libitum*

The respective nutrient contents and energetic value estimation (EvaPig® software, 2008; Noblet *et al.,* 2004) can be seen in Table 2. The live weight was controlled to regular intervals of four weeks, as well as the consumption of feed when it was supplied *ad libitum*. A semiextensive regime was always followed, that is, supply on the basis of fodder but in outdoor

parcels with spontaneous vegetation, camping type refuges and free space to favor the natural behaviour of the animals. The health and behaving of pigs were regularly inspected.

Table 2. Chemical composition (% on DM) and estimated digestible energy (DEf) of different feed mixtures used in the years 2008 and 2009

Year	2008 and 2009	2009	2009
Feed	**Rearing**	**Fattening**	**Finishing**
Crude protein	17.4	12.0	9.3
Ether e xtract	4.4	3.4	3.0
Crude fiber	6.6	3.5	3.1
DE_f (MJ $kgDM^{-1}$)	13.9	13.5	13.4

III – Results and discussion

All pigs remained in good health throughout the experimental periods and no feed refusals were detected.

Figure 1 shows the evolution of the live weight of the animals with both different strategies of growth and fattening applied throughout 2008 and 2009 years. The figure already shows a close up view of the feed conversion rates (kg of feed kg^{-1} of increase of weight) and daily increase of weight (kg) (see Table 3). During the period from five to six months, with feed ingestion *ad libitum*, there were no differences in conversion rates and average daily gain (ADG) between rearing and growth feed mixtures. From eight to 10 months, employing fattening feed, which has less total energetic and protein contents that rearing feed and has minor total consumption too, it was obtained the same final live weight for both feed mixtures. The methodical pre-established for control of the evolution of the live weight was identical for both years and it was determined to 10 months. It turns out to be, so, the most appropriate age to effect productive contrasts.

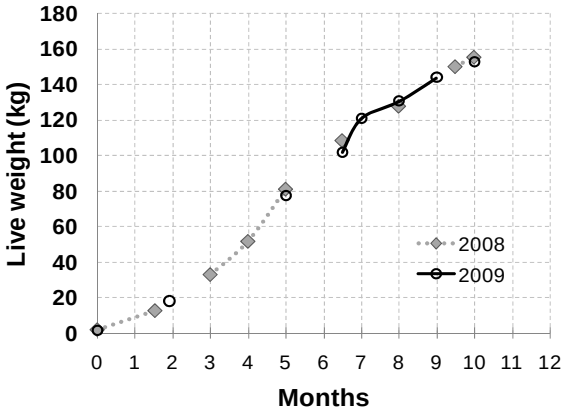

Fig. 1. Monthly live weight evolution along 2008 and 2009 years.

As expect, the final average live weight of the males turned out to be superior to that of the females (162.3 *vs* 143.5 kg; $p<0.01$). However, as for the different strategies, both males and females considered together in results, there are no significant differences, (155.2 kg in 2008 vs

152.2 kg in 2009). Nevertheless, the total consumption of feed up to 10 months of age is different: 727.5 kg in 2008 *vs* 577.5 kg in 2009 (P<0.001). According to the mentioned values, the global feed conversion ratio from the weaning up to 10 months would be of 5.1 in 2008 *vs* 5.3 in 2009 and the results concerning the same period for ADG were 593 g for 2008 *vs* 509 g for 2009 respectively. The results are in agreement with those of Barea *et al*. (2007) and Nieto *et al*. (2009) report on Iberian pig.

In addition to the advantage of using more economical feed for equal deposition of protein in the body of the animals, we have to mention the environmental importance of a minor excretion of urinary N to the environment.

Table 3. Feed conversion rates (kg feed kg live weight gain^{-1}) and average daily gain (ADG, kg) according to the different target feeding used in 2008 and 2009

Year 2008				
Period	**Feed**	**Dose**	**Feed: Gain**	**ADG**
Weaning-3 months	Rearing	*Ad libitum*	2.81	0.534
3-4 months	Rearing	*Ad libitum*	4.21	0.670
4-5 months	Rearing	*Ad libitum*	4.09	0.727
5-6 months	Rearing	*Ad libitum*	4.78	0.643
6,5-8 months	Rearing	*Ad libitum*	8.09	0.544
8-9,5 months	Rearing	*Ad libitum*	8.50	0.294
9.5-10 months	Rearing	2.5 kg pig^{-1} day^{-1}	3.38	0.740
Year 2009				
Period	**Feed**	**Dose**	**Feed: Gain**	**ADG**
Weanig-5 months	Rearing	*Ad libitum*	4.20	0.672
5-6 months	Growing	*Ad libitum*	4.77	0.684
6-7 months	Growing	*Ad libitum*	3.46	0.578
7-8 months	Fattening	2 kg pig^{-1} day^{-1}	5.14	0.389
8-9 months	Fattening	2 kg pig^{-1} day^{-1}	5.58	0.448
9-10 months	Fattening	2.5 kg pig^{-1} day^{-1}	8.85	0.282

The need for more investigations on growth remains open and the objectives should be considered because no clear trends in the market can be detected today.

IV – Conclusions

The present results in semi-extensive farming of the Gochu Asturcelta pigs suggest that, after the weaning, it is possible to shorten the period of supply *ad libitum* during growth performance. During the following phase of fattening, it is interesting to restrict both energetic and protein supplies, dosing 2-2.5 kg feed pig^{-1}day^{-1} with 13.2 MJ kg DM^{-1} of digestible energy and 12-10% of crude protein on DM basis. However, further work is needed to investigate the effects of those feeding levels on growth and meat quality of Gochu Asturcelta pig to determine the optimal feeding level.

Acknowledgements

The authors are grateful to the field support staff and to the laboratory of Nutrition staff of the Nutrition, Grasslands and Forages Department of SERIDA for the well done tasks. The investigation has been supported by the Regional Ministry of Rural Environmental and Fisheries of the Principality of Asturias and SERIDA.

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