EVALUATION OF SOME PRODUCTIVE TRAITS IN LARGE WHITE AND DUROC BREEDS

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Abstract:

A total of 20 sows from two populations of Large White and Duroc breeds were analyzed for the number of piglets born alive per litter, litter size and the average daily gain. Gestation period lasts 15 days more in Duroc breed. Litters/sows/year was 2.4 and 2.2 in Large White and Duroc respectively. The litter size was 11.8 and 9.7 piglets in Large White and Duroc respectively. This difference is easily noticed until the 28th day of lactation period. Milk yield from Large White sows on first parity was 67.2 kg, meanwhile from the Duroc sows 55 kg. The litter size of Large White breed increases through second and third parity by 0.8 and 1.4 piglets respectively. The mean piglet birth weight was1460 gram and 1320 gram for Large White and Duroc respectively. This difference was displayed until 28 days of lactation period. Piglets mean weight was 7.3 kg and 6.9kg for Large White Duroc respectively. From this age to onward, Duroc breed displayed a better performance regarding this indicator. The results obtained here, shows that Large White has a larger birth litter size and a better growth rate until 28 days of age. Meanwhile, Duroc breed shows a high growth rate and this trait is passed down to next-generation. The two populations indicate variability for each distinct trait, which is very important for selection.

Key words: Breed piglets, litter size, litters/sows/year, lactation, average daily gain.

1. Introduction

Improvement of sow productive and reproductive performance reduces the costs of pork production [1]. Most selection efforts in pigs have been made with the purpose of improving pig efficiency. Selection for economically important traits in farm pigs is normally based on the phenotypic records of the individual and its relatives. Response to selection for a multi-trait objective depends not only on the economic-genetic variation, but also on the accuracy with which the breeding value of each trait is estimated, as well as correlations among traits. The estimate for traits of economic importance (production and reproduction) calls for high degree of accuracy in order to optimize the estimation of breeding value and that of breeding objectives and breeding schemes. Therefore, this paper is focused on evaluation of some productive traits in Large White and Duroc breeds.

2. Material and Methods

The study was carried out in Lezha region, Albania. The feeding and the micro-climate requirements are in according to the technological requirements for an optimum growth. Ten sows of Large White and Duroc breeds from two populations were included

in study. The second parity served as a basis for studying litter size. In addition, the progress is reported on the bases of the 2nd and 3rd parities. Growth rate of piglets (n= 20 for each breed) from the age of 65 days up to 130 days and 220 days was studied. The data were collected and analyzed for following indicators:

identification (record) of piglets at the age of 28th day;

mating animal taking care to avoid inbreeding by using rotational schemes;

data on pregnancy and parturitions for each sow

registration of the reproductive indicators for each sow by means of cards;

Registration of live weight and growth rate for each piglet according to the ages: at birth, 28, 65, 130, 220 days age of, and size of litter at birth.

The daily gain was calculated based on the formula:

$$\frac{Z - V}{AF - AB}$$

Z: Live weight at the end of the period

V: Live weight at the start of the period

AF: Age at the end of the period

AB: Age at the start of the period

Other set of indicators recorded included: weight and litter size at birth, weight and litter size in the weaning, weight of litter at the 65th day, weight of litter at the 220th day, daily weight for each period of time

The purpose of the study was to know the genetic and reproductive capacity of these breeds regarding the litter size and weight, and the growth rate of their offspring up to sale with the aim to show the abilities of these breeds with respect to meat quality and their rearing effectiveness.

2.1 The breeding conditions

During the first month of pregnancy the adequate amount of feed was used for the sows in order to supply the requirements for maintenance and to restore the sow's body condition and fat reserves [3]. An intake of 2.1-2.3 kg feed per sow per day was used in the first stage of pregnancy. A large intake of the feed was used during the last month of pregnancy for fetal development and growth of the udder. Feed ration was changed in the last weeks when the sows were transferred to farrowing unit in order to meet nutritious requirements for coming lactation. Feed ration was given twice a day to all sows. The water was taken through drinking equipment depending on sows' need. The feed for piglets during the lactation was colostrums, used in the first days, along with milk. During this period the enzymatic system of digestion is capable of utilizing only milk that is taken by sow. The supplementary feed depends much on the rate of meeting requirements of piglets by milk of sow. When the nutrients obtained through sow's milk to be inadequate then supplementary feed needs to meet requirements for each piglet, which is assigned from the difference (requirement - the amount of milk produced

by sow) [4]. The supplementary feed (pre-starter) was given in the middle of the second week. During this period was faced an increase in the difference between the requirements of the piglets in energy and proteins and provision of such nutrients through milk. This difference needs to be supply through feed. This allows the pigs to become accustomed to plant-related feed and to avoid any shock resulting from the huge amount of feed or when they are weaned [6]. The pre-starter contains 13.5 MJ EM/kg and 21 % CP, at a time when the most developed digestion tract of the weaned piglets allow a lower concentration of nutrients in pre-starter II (12.5 MJ EM/kg and 17 % CP) [6].

The study has shown that in order to promote development of the enzyme system during the second week the piglets should take the supplementary feed (pre-starter) and during the first day of the sixth week, piglets are fed with pre-starter and starter feed.

3. Results and Discussion

3.1. Productivity

One of the purposes related to rearing sows is to get as many litters out of it as possible. The productive abilities of sows have to be rationally and effectively used in order to obtain low cost meat. In the Large White breed, the difference in days between the two parities is roughly 148 days, while in the Duroc breed is roughly 163 days or 15 days more. The number of births for each sow per year is very important with regard to the economic efficiency of breeding the species [2]. In the case of Large White, the difference measured in days between the two parities was roughly 148 days and 2.4 litters/sows/year, while in the Duroc breed it is roughly 163 days or 15 days more, and 2.2 litter/sows/year. The Large White has a higher productivity than the Duroc breed.

3.2 Litter size

The second and third litters of all sows were analyzed for calculating the litter size.

The comparison of data reveals that the Large White has a larger litter size than the Duroc breed. The litter size was 11.8 and 9.7 piglets in Large White and Duroc respectively, or 2.1 piglets more. This difference between Large White and Duroc breeds is easily noticed until the 28^{th} day of lactation period, or weaning period. Another important set of data has to do with the amount of milk produced. The more milk the sow produced, the quicker the piglets grow up and the more weight they gain during the period from birth to weaning [2]. Milk yield from Large White sows on first parity was 67.2 kg, meanwhile from the Duroc sows 55 kg., or 12 kg less.

Table 1. Data on the performance of some traits for the Large White (L) and Duroc (D) breed.

No	***At birth***						***28 days of age***						Morality (%)	
	Number of piglets BA		Litter-live weight kg.		Piglets-live weight kg.		Number of piglets		Litter-live weight kg.		Piglets-live weight kg.			
	L	D	L	D	L	D	L	D	L	D	L	D	L	D
1	10	9	12.5	11.1	1.250	1.230	8	8	41.1	49.6	5.14	6.2	20	11.1
2	10	7	12.2	9.1	1.220	1.300	10	7	56.5	58.1	5.65	8.3	-	-
3	14	9	17.0	11.4	1.214	1.270	12	9	79.5	64.1	6.63	7.2	14.2	-
4	10	12	13.0	14.3	1.300	1.190	9	12	67.6	76.6	7.51	6.3	10	-
5	11	12	12.0	14.2	1.090	1.180	10	9	63.5	61.4	6.35	6.8	9	25
6	11	7	12.1	11.3	1.100	1.620	10	7	70.2	43.9	7.02	6.2	9	-
7	11	9	14.0	11.3	1.270	1.250	11	8	73.1	53.9	6.64	6.7	-	11.1
8	15	11	15.0	14.0	1.000	1.270	13	8	63.1	39.8	4.85	4.9	13.3	27.3
9	15	11	17.2	14.6	1.146	1.330	12	8	85.0	48.2	7.08	6.0	20	27.3
10	11	10	13.0	12.0	1.181	1.200	9	9	78.5	60.09	8.72	6.7	18	10

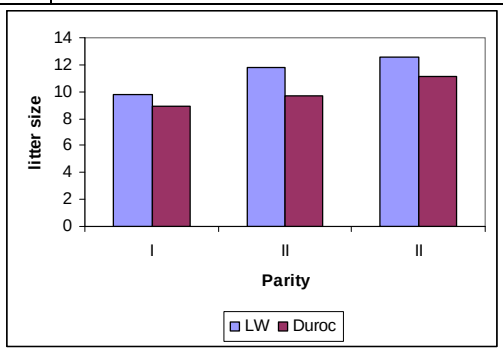

Figure1. Litter size for the two breeds LW and Duroc in three successive parities.

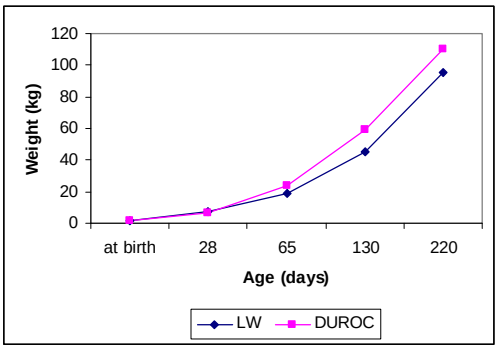

Figure 2. The dynamics of live weight according to age of pigs for LW and Duroc breeds (compared).

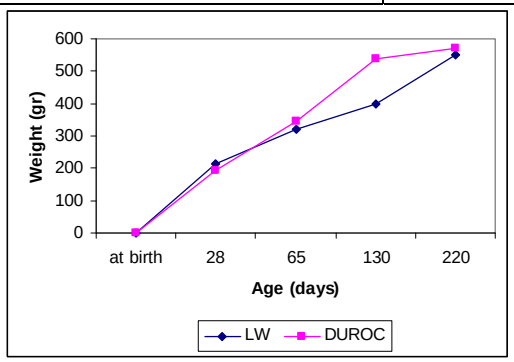

Figure 3. The dynamics of average daily gain according to age (days) of pigs for LW and Duroc breeds (compared).

As shows the above data, the mean piglet birth weight was 1466 gram and 1320 gram for Large White and Duroc respectively, or 146 gram more. This is an important indicator in the later development. At the age of 28 days these indicators vary significantly. The sow (LW) because of the high quality milk is capable of rearing piglets much better with an average weight growth

of 7.3 kg against 6.9 kg of Duroc, or 0.4 kg more. The pigs of the Duroc breed at the age of 65-70 days, show advantages against the LW ones. Hence at the age of 65-70 days, the body weight of pigs of Duroc breed is, on the average, 23.8 against 19.2 kg of LW ones. The same tendency is seen at the age of 130 days, where Duroc shows an advantage over LW of some 13 kg. As a result of this rapid growth, the pigs of Duroc breed reach to weight of 100 kg in 13 days period earlier than Large White breed, even though it has 40 kg less feed per sow. From the above results it's easy to point to the better qualities that Duroc breed shows a high growth rate and this trait is passed down to next-generation. Thus this breed has much more advantages when used as the father breed in cross-breeds [5].

4. Conclusions

The two breeds have high genetic and productive abilities. The LW is set apart for a larger litter size and a better growth until the age of 28 days, when piglets are being fed with the milk of the sow. Therefore it's recommended that it acts as a mother breed in cross-breeds [5].

The Duroc breed shows features that are common to the standards of the breed itself. The Duroc breed has a high growth rate, a feature which is easily inherited in the offspring. Therefore it's recommended that it acts as a father breed in the cross-breeds [5].

The two populations indicate variability for each distinct trait, which creates a possibility for a better selection. Just because of this variability, there is space for further research in this field.

5. References

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