Slovak J. Anim. Sci., 42, 2009 (1): 1 - 5

ISSN 1335-3686

REPRODUCTION OF EAST BALKAN SOWS FROM THE HERD OF THE EXPERIMENTAL STATION OF AGRICULTURE - SREDETS

N. PALOVA[1]*, Y. MARCHEV[2]

[1]Experimental Station of Agriculture – Sredets, Bulgaria; [2]Agrucultural Institute – Shumen, Bulgaria

ABSTRACT

Reproduction characteristics of the East Balkan aboriginal breed sows were monitored over a three-year period (2004-2006). The results recorded from 50 sows of 7 litters were analyzed. The duration of the reproductive cycle of sows, percentages of fertilized and farrowed sows and their lifetime fertility were monitored. The live body weight of the offspring at farrowing, their survival rate and growth rate up to the age of 21 days were determined. The seasonal pattern of reproduction of sows revealed the higher average age of the first farrowing (553 days). The average reproductive cycle, determined through the number of litters per sow, was 5.2; 1.45 litters per year with 7.06 live-born piglets per litter were recorded. The effect of the year on the live body weight at birth (0.988 kg), the litter size at the age of 21 days (6.05) and the growth rate up to the age of 21 days were statistically significant (P<0.05).

Key words: East Balkan sow, reproduction, litters per year, litter size

INTRODUCTION

The potential for multiparity in some domestic animal species, including *Sus scrofa*, could be interpreted as a historically occurring and genetically determined product of evolutionary adaptation (Svechin, 1976). East Balkan swine, similarly to wild forms, are characterized with a late onset of maturity and their growth end by the age of 2.5 years. They reach a live body weight of 100 kg for about a year (Palova, 2007). The reproduction could begin after reaching live body weight of 70 kg in sows or 80 kg in boars. They usually give birth twice yearly – in the spring and the autumn. The duration of gestation is 112–114 days. The fertility varies from 5 to 8 live-born piglets and 3.5-6 piglets alive at weaning (Stoykov et al., 2006), but studies in this field are very few and sporadic. Danchev (1984) pointed out that East Balkan swine was phylogenetically able to utilize natural trophic resources with a low nutritive value. Natural macro- and microelements stimulate the immune response and improve the reproductive properties (Dimitrov et al., 2003). The reproduction in this breed is reliable and the survival rate of the offspring is high.

The purpose of this study was to investigate reproductive traits of pigs from the herd of the Regional Centre for Scientific and Practical Services, Sredets with regard to their renovation and to certify their reliability under biological rearing conditions.

MATERIAL AND METHODS

The reproductive traits of sows were checked over a three-year period (2004-2006). The study was carried out on 50 sows and the results from 7 litters were analysed. The duration of the active period of sows, the percentages of fertilized and farrowed sows and their lifetime fertility were monitored. The number of the live body weight of the offspring at farrowing and their survival and development up to the age of 21 days were determined.

***Correspondence:** E-mail: nadejda_palova@abv.bg
1 G. Dimitrov sq., 8300 Sredets, Bulgaria
tel.+fax: +359 5551 7793; GSM +359 885 953 048

Received: January 13, 2009; Accepted: February 17, 2009

All data were statistically processed, and specific traits were evaluated according to values of multifactorial LS ANOVA analysis (Hinkovski et al., 1984).

RESULTS AND DISCUSSION

Table 1 shows the data about the average age of sows, the reproductive traits and the duration of their active utilization. The average age of sows from the herd was 3.5 years: 3.0 years in 2004, 3.9 years in 2005 and 3.6 years in 2006. The difference of 0.9 years between 2004 and 2005 in our opinion is high and indicates the irregular replacement of gilts in the herd with regard to optimization of age structure.

It is known that East Balkan pigs reach sexual maturity lately – after the age of 1 year, whereas the age at first farrowing is 450-470 days (Hinkovski et al., 1984). The analysis of our data showed average age at first farrowing of 553 days that was over the physiological limit for the breed. This fact could be explained by the seasonal pattern of breeding and farrowing that presumes omitting of first oestruses and delayed breeding with regards to the formation of technological groups in the season, most favorable for herd reproduction.

The duration of active use, determined by the number of litter per sow for its entire productive life, was 5.2 at the average. A higher value (6.5) was observed in 2005 compared to 2004 (3.5), during which the culling rate of sows was higher and the replacement of the herd has been increased by 50 %. The higher culling rate had an effect on the percentage of farrowed sows and the average yearly number of litters. The highest number of farrowed sows was in 2005 (94%), and the least - in 2004 (66%). Totally for the period of the study, 1.45 litters per year were recorded and this trend was preserved for the different years as well: 1.66 for 2005; 1.55 for 2006 and 1.18 for 2004.

The average number of live-born piglets per litter was 7.06 for the entire period of the survey, which was within the normal range for the breed (Table 3). The number of liveborn pigs in different years was variable with more considerable, although not statistically significant, differences at first (0.32) and last (-0.31) years of the study. Identical results were observed in different months of the year as well. The differences in either positive or negative direction were not statistically significant. It should be noted that there were two peaks in farrowings: in February-May (spring) and September-December (autumn), that is typical for wild pigs. Similar results were reported by Egerszegi et al. (2003) for reproductive traits of the aboriginal Hungarian pig Mangalica: active period of 6 litters on the average, 1.5 farrowings per year for the breed and 6.73 live-born piglets per litter. A higher number of live-born piglets was observed during the spring farrowing, when the deviations from the mean were in a positive direction and a lower number – in summer months.

An average live body weight at birth was 0.988 kg. Male piglets were heavier at birth (1.001 kg) than females (0.969 kg). This trait was more markedly influenced by the year. The difference between 2004 (0.131 kg) and 2006 (-0.156 kg) was statistically significant ($P<0.05$).

The litter size at the age of 21 days was on the average 6.05 piglets. The year had an effect on the number of piglets per litter up to the 21st day of age. The litter born in 2004 was more numerous (a=0.64) compared to those born in 2006 (a=-0.85), the difference was statistically significant ($P<0.001$).

For different months of the year, the litter size at the age of 21 days was variable. Largest litter was born in February (a=2.78) and the smallest – in April (a=-0.84). Despite this, observed differences were not significant and we could not state for sure an effect of a given month of the year on litter size at the age of 21 days. The gender of piglets and the live body weight at birth did not influence significantly respective survival rates.

The rates of growth and development up to the age of 21 days were different for all controlled piglets. A year had a statistically significant effect ($P<0.001$) on live body weights of pigs. The highest growth rate was observed in 2006 (a=0.196), and the lowest – in 2004 (a=-0.246). Piglets grew more intensively during summer months compared to winter ones, but the differences were not statistically significant. In our opinion, different

Table 1: Average age of sows and reproduction of the herd

Year	Age of sows years	Age at first farrowing days	Farrowed sows per year No	Farrowed sows per year %	Litters per year No
2004	3.0	540	33	66	1.18
2005	3.9	569	47	94	1.66
2006	3.6	551	40	80	1.51
Average	3.5	553	40	80	1.54

Table 2: Fertility of sows

Factors	Number of litters	Number of live-born piglets						Live body weight at birthm kg					
		male		female		total		male		female		Total	
		a	SE	a	SE	a	SE	a	SE	a	SE	a	SE
LS mean	240	3.72	0.20	3.34	0.21	7.06	0.23	1.001	0.031	0.969	0.032	0.988	0.030
Year:													
2004	66	-0.17	0.17	0.33	0.19	0.32	0.21	0.152	0.028	0.119	0.028	0.131a	0.027
2005	94	0.21	0.14	-0.21	0.15	-0.06	0.17	0.009	0.023	0.036	0.023	0.022	0.021
2006	80	-0.19	0.15	-0.11	0.16	-0.31	0.18	-0.160	0.024	-0.156	0.024	-0.156a	0.022
Month:													
I	5	-1.43	1.32	1.90	1.76	1.54	1.38	0.154	0.098	0.271	0.077	0.180	0.126
II	48	1.29	1.19	1.32	1.25	2.61	1.42	-0.529	0.187	0.031	0.191	-0.009	0.178
III	44	0.29	0.71	0.65	0.75	0.94	0.85	0.005	0.112	0.036	0.115	0.004	0.107
IV	51	-0.51	0.27	-0.54	0.29	-1.05	0.32	0.075	0.043	0.071	0.044	0.075	0.041
V	14	-0.21	0.28	-0.50	0.29	-0.70	0.33	-0.015	0.043	-0.036	0.044	-0.034	0.041
VI	9	-0.35	0.32	-0.28	0.34	-0.63	0.38	-0.032	0.050	-0.092	0.052	-0.061	0.048
VII													
VIII													
IX	28	0.81	0.63	-0.62	0.66	0.18	0.75	0.015	0.099	-0.014	0.101	0.013	0.094
X	17	-0.71	0.32	-0.22	0.34	-0.93	0.38	-0.078	0.051	-0.126	0.052	-0.098	0.048
XI	13	-0.15	0.29	-0.12	0.31	-0.28	0.34	-0.013	0.046	-0.016	0.046	-0.015	0.043
XII	21	-0.44	0.37	0.32	0.39	-0.12	0.44	0.096	0.058	0.145	0.059	0.126	0.056

a - ($P \leq 0.05$)

Table 3: Piglet survival rate at the age of 21 days

Factors	Number of litters	Litter size at the age of 21 days						Live body weight at the age of 21 days, kg					
		male		female		total		male		female		total	
		a	SE	a	SE	a	SE	a	SE	a	SE	a	SE
LS mean	240	3.26	0.20	2.79	0.20	6.05	0.21	3.119	0.111	3.141	0.116	3.130	0.100
Year:													
2004	66	0.11	0.18	0.46	0.17	0.64a	0.19	-0.139	0.099	-0.354	0.103	-0.246b	0.089
2005	94	0.31	0.14	-0.31	0.14	0.21	0.15	0.034	0.079	0.074	0.083	0.050	0.071
2006	80	-0.42	0.15	-0.43	0.15	-0.85a	0.15	0.105	0.084	0.280	0.087	0.196b	0.075
Month:													
I		-	-	-	-	-	-	-	-	-	-	-	-
II	48	1.62	1.19	1.74	1.16	2.78	1.25	-0.319	0.661	-0.107	0.688	-0.212	0.594
III	44	-0.38	0.72	-0.25	0.70	-0.35	0.75	-0.137	0.398	-0.140	0.415	-0.134	0.358
IV	51	-0.24	0.27	-0.44	0.27	-0.84	0.29	-0.065	0.152	0.146	0.159	0.036	0.137
V	14	-0.10	0.28	-0.12	0.27	-0.18	0.29	-0.091	0.155	-0.249	0.161	-0.187	0.140
VI	9	-0.51	0.32	-0.14	0.31	-0.51	0.34	-0.176	0.179	0.100	0.187	-0.039	0.162
VII	28	0.42	0.62	-1.01	0.61	-0.51	0.66	0.139	0.349	0.068	0.364	0.072	0.314
VIII	17	-0.34	0.32	-0.23	0.31	0.54	0.34	0.218	0.180	-0.009	0.188	0.101	0.162
IX	13	-	-	-	-	-	-	-	-	-	-	-	-
X		-	-	-	-	-	-	-	-	-	-	-	-
XI	13	-0.41	0.29	-0.12	0.28	-0.54	0.30	0.112	0.162	-0.039	0.168	0.038	0.145
XII	21	-0.39	0.37	0.59	0.36	0.17	0.39	0.320	0.205	0.231	0.214	0.325	0.184

a,b - (P≤0.001)

growth rates of piglets were influenced by a number of additional factors: the amount of milk available from the sow, nutrition, microclimate, stress related to the mandatory procedures etc.

CONCLUSIONS

The seasonal pattern of sow reproduction determined the higher average age of the first farrowing – 553 days. The average reproductive cycle, determined through the number of litters per sow, was 5.2 at the average. 1.45 litters per year with 7.06 live-born piglets per litter were observed. The effect of the year on the live body weight at birth (0.988 kg), the litter size at the age of 21 days (6.05) and the growth rate up to the age of 21 days were statistically significant (P<0.05).

REFERENCES

DANCHEV, Y. 1984. The aboriginal primitive East Balkan pig breed in Strandzha. In: *Strandzhansko-Sakarski Scientific Works Collection*, 1984, Malko Tarnovo, vol. II, no.1, p. 245.

DIMITROV, M. – YOTOV, S. – VASILEV, N. – GEORGIEV, P. – IVANOV, I. – DIMITROV, F. 2003. Effect of organic selenium Sel-plex upon to productivity of swine dams and newly born piglets. In: *Proceedings of Scientific Conference with International Participitation "70 years RVMI"* V.Tarnovo, 2003, p. 121-127. 954-775-219-7

NIKOLOV, V. 2004. The need of preservation of local autochtonous breeds, Breeding programmes, In: *Scientific Works Collection*, 2004, p.7-11. ISBN 954-9391-03-05

PALOVA, N. 2007, Evaluation of the main fattening and slaughtering traits of East Balkan pigs reared under natural conditions, In: PhD Thesis, 2007, p. 7-29.

HINKOVSKI, T. – MAKAVEEV, T. – DANCHEV, Y. 1984. In: *Local domestic animal breeds*, Zemizdat : Sofia, 1984, Code 05 9533428211, p. 88-104.

SVECHIN, K. 1976, Individual development of domestic animals, In: *Urozhay*, Kiev, 1976, no. 2, p. 17-24.

STOYKOV, A. – MARCHEV, Y. – IVANOVA-PENEVA, S. – KULEV, K. 2006. A breeding programme aimed at preservation and utilization of East Balkan swine, In: *Shoumen*, 2006, p. 2.

STOYKOV, A. – IVANOVA-PENEVA, S. – MARCHEV, Y. – DRAGOEV, P. – GINEVA, E. – KULEV, K. 2007. Preservation, sustained development and effective utilization of East Balkan pigs, In: *Jnournal of Animal Science* (Sofia), no 5, p. 34-38.

IVANOVA-PENEVA, S. – MARCHEV, Y. – STOYKOV, A. 2007. Rearing of East Balkan pig breed according to EC requirements, In: *Academic Edition of the Faculty of Agriculture*, Plovdiv, vol. LII, p.289-294.

EGERSZEGI, I. – RATKI, J. – SOLTI, L. – BRUSSOW, K.-P. 2003. Mangalica - an indigenous swine breed from Hungary, In: *Arch. Tierz.*, Dummerstorf vol. 46, no. 3, p.245-256.