EFFECTS OF DIFFERENT HOUSING CONDITIONS ON PIG PRODUCTIVITY

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Introduction

Piglet losses during the nursing period pose a major problem in intensive pig breeding, whereby contusions may cause more than 30% of all liveborn piglet losses during their stay in farrowing pen (Krsnik et al., 1996; Kunz and Ernst, 1987). Therefore, farrowing pens with sow wedging were introduced in intensive pig production in the 1960s. The wedging is so designed as to restrict extensive movement of the sow body, thus to make the floor area safe for piglets and protect them from crushing. However, a space too narrow for the sow may cause sow anxiety as an indicator of the pen uncomfortableness (Herskin et al., 1998). This manifests as frequent sow standing up, changing body position and interruption of sucking, which entails piglet fasting, retarded growth and eventually death from exhaustion. Therefore, a number of studies assessed the behavior of sows and piglet losses in the currently used farrowing systems (Blackshaw et al., 1994; Lou and Hurnik, 1998; Harris and Gonyou, 1998), some of them being evaluated as by no means favorable for animal welfare. Thus, new farrowing facilities providing a roomy space for sow have been designed, and their efficiency in terms of animal welfare and production results has been investigated in practice.

Material and Methods

The present study was conducted at a pig breeding farm in north-west Croatia. Piglet production results were recorded over 12 months at two facilities with different types of farrowing pens. In house A, there were 56 sows on an average in individual pens of 1.6x2.1 m in size, with fixed parallel sow wedging of 0.6 m and two lateral piglet spaces of 0.6 and 0.4 m in size. In house B, there were 66 sows on an average in individual pens of 1.7x2.4 m in size, with parallel sow wedging adaptable to the sow size by longitudinal and transverse extension of its metal structure. The sows were of various breeds and parity, and were placed in the pens 4 days before the expected farrowing. The sows and piglets in all facilities were fed twice daily a fodder mixture containing 18% of raw protein. The piglets were given

supplemental mixture containing 24% of raw protein from day 5. The mixture was given in pellets with the addition of flavor for taste improvement. During the study, microclimatic factors (air temperature, relative humidity, air flow velocity) were regulated by a Testo 400 instrument (Germany). Measurements were performed every three days during the study period.

Results

Microclimate measurements in the two study facilities showed the mean air temperature during the study to be 22-23°C, mean relative humidity 76%-77%, and mean air flow velocity 0.20 m/s. Study results are presented in Tables 1 and 2.

Table 1. Piglet production results in farrowing pens sized 1.6x2.1 m

No. of sows *per* shift	Liveborn piglets *per* sow	Stillbirths *per* sow	Total no. of piglets	Birth weight (kg)	Died	Killed	Total loss	Weanlings *per* sow	Body mass
57	10.29	0.60	10.89	1.37	7.28	5.31	12.59	8.92	7.12
57	10.10	0.89	10.99	1.42	7.21	5.30	12.51	8.84	6.35
57	9.97	0.94	10.91	1.41	9.97	4.83	14.80	8.49	6.31
57	9.95	0.93	10.88	1.39	8.91	3.63	12.54	8.70	6.53
56	9.97	0.75	10.72	1.38	6.04	3.59	9.63	9.00	6.48
57	9.81	0.67	10.48	1.38	5.70	3.16	8.86	8.94	6.63
55	9.36	0.62	9.98	1.37	5.34	2.37	7.71	8.63	6.98
55	9.90	0.61	10.51	1.37	7.33	5.72	13.05	8.56	6.14
56	10.73	0.46	11.19	1.33	7.67	6.59	14.26	9.00	6.08
56	9.90	0.66	10.56	1.40	6.07	3.49	9.56	8.94	7.09
56	10.0	0.71	10.71	1.38	7.15	4.40	11.55	8.80	6.57

Table 2. Piglet production results in farrowing pens sized 1.7x2.4 m

No. of sows *per* shift	Liveborn piglets *per* sow	Stillbirths *per* sow	Total no. of piglets	Birth weight (kg)	Died	Killed	Total loss	Weanlings *per* sow	Body mass
69	9.81	0.74	10.55	1.33	7.09	5.02	12.11	8.62	7.30
60	10.48	0.67	11.15	1.42	6.84	2.22	9.06	9.53	8.03
61	10.97	1.06	12.03	1.42	11.66	3.59	15.25	9.30	6.38
61	9.70	1.18	10.88	1.41	8.45	5.74	14.19	8.33	6.94
54	9.81	0.76	10.57	1.38	6.04	4.72	10.76	8.76	8.18
58	9.57	0.93	10.50	1.38	5.59	2.89	8.48	8.76	7.03
62	9.95	0.70	10.65	1.39	4.21	1.62	5.83	9.37	7.37
76	10.00	0.40	10.40	1.35	3.16	1.71	4.87	9.51	6.54
79	11.25	0.74	11.99	1.28	8.32	6.75	15.07	9.56	6.74
78	10.15	0.64	10.79	1.37	7.19	6.06	13.25	8.81	6.26
66	10.17	0.79	10.96	1.37	6.86	4.03	10.89	9.06	7.08

Discussion

Numerous farrowing systems have been tried to date, e.g., family system of keeping animals in farrowing pens with enriched environment for four sows (Stolba, 1981), free keeping of animals including six farrowing pens and common space for sows (Boe, 1993), free farrowing system developed in Scotland (Baxter, 1991), or various farrowing pen types designed in particular studies (Phillips et al., 1991; Lou and Hurnik, 1998). Generally, the size of farrowing space has been demonstrated to influence the sow behavior and maternal attitude to piglets, which can in turn have favorable effects on piglet productivity. A study of two different farrowing systems showed the number of crushed piglets in farrowing pens without wedging to be three- to fivefold that in the farrowing pens with wedging (Blackshaw et al., 1994; Weary et al., 1996). The type of wedging can also influence piglet productivity, whereby the ellipsoidal shape proved superior to the usual rectangular shape of wedging (Lou and Hurnik, 1994). Our study was based on the observation and comparison of production results in the two facilities according to pen size. A higher rate of liveborn piglets (10.17 *vs* 10.00), a lower rate of total loss (10.89 *vs* 11.55), and a greater number of weaned piglets *per* sow (9.06 *vs* 8.80) were recorded in the more spacious pen with adjustable wedging as compared with the smaller pen with fixed wedging. In addition, the former pen type was associated with a greater body mass of weaned piglets (7.08 *vs* 6.57), confirming the report on heavier piglets upon weaning in larger farrowing pens (Biensen et al., 1996). The rate of stillbirths is higher in sows kept in wedging than in other types of farrowing pens (Cronin et al., 1996), thus the size of pen with wedging cannot be expected to influence this type of losses in intensive pig breeding.

Conclusion

The conditions of sow keeping in larger farrowing pens with adjustable wedging according to sow size is expected to result in a higher number of weaned piglets and greater piglet weight upon weaning in comparison with animal keeping in small pens with fixed wedging. Yet, this is just an alternative in terms of animal welfare, which should be adapted to the European Union requirements considering sow housing.

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