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A study on single versus group housed organic lactating sows concerning piglet performance and sow behaviour

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Abstract

Group housing of lactating sows is close to natural behaviour and therefore favored in organic farming. But there is no information about advantages or disadvantages, especially concerning the imponderability of the longer organic suckling period. Therefore 74 litters of single housed lactating sows, 51 litters of sows grouped at 3 and 39 litters of sows grouped at 6 were tested concerning sow behaviour and piglet performance with the following results: Group housing causes a higher level of activity and disturbance; grouping at 3 or at 6 results in nearly the same total level of agonistic behaviour; piglets' live weight gain, health status and loss rates remain unaffected by the 3 systems. It is concluded that group housing is practicable for organic lactating sows. The strict obedience of the grouping rules (≤ 5 days between piglets' grouping age, no grouping of diseased sows and no primiparous sow alone with multiparous sows) is essential for a successful implementation.

Key words: Organic group housing, lactating sow, piglets, behaviour, performance

Introduction

Post partum group housing of lactating sows is close to natural behaviour (Rist 1989) and is often favored by organic farmers and advisors. Disadvantages can consist in agonistic interactions between sows (Weary *et al.* 2002), reduced animal health and higher loss rates (Weber 2001), and spreading of litters' live-weight development (Wülbers-Mindermann 1992). Especially the longer organic suckling period compared to conventional piglets is an imponderable effect. But there is only scientific information for conventional group housing systems (e.g. Weber 2000). Hence, the following study was designed in order to reduce the gap concerning group housing of organic lactating sows.

Material and methodology

The study comprised 74 litters of single housed lactating sows versus 51 and 39 litters with lactating sows grouped at 3 and at 6 respectively. The trial started with litter grouping 14 days *post natum* and ended at day 63 *p. n.* with a 49-days suckling period. The following grouping rules were obligatory: maximal difference of 5 days between piglets' grouping age, no grouping of diseased sows, and no primiparous sow alone with multipara sows. Data sampling included (i) piglets' growth performance (weekly weighing), health status (documentation of diseases) and loss rates (documentation), and (ii) sows' behaviour (12-h video recording and continuous analysis software programmed in VBA) recorded at three times (day of grouping, middle and end of suckling period) concerning activity, duration of sitting, of ventral and of lateral recumbency, duration and number of suckling acts, and rate of agonistic acts (chasing-up; cranial, lateral and caudal head butts; disturbance of suckling; violence against piglets). Suckling (act) is defined as "at least 50% of the piglets of a litter massage the teats". Data were analyzed with ANOVA / GLM-procedure using SAS; frequency-related data were tested with FREQ-procedure.

Results

Table 1 shows the results concerning growth performance. Obviously, there are no differences in piglets' live weight development between the three housing systems. The separate description is necessary because the age structure of the sow herd changed during the trial period and 6-sow-grouping took place in the second half of the trial period after 3-sow-grouping. The statistical data analysis showed that the coefficient of variation of the litter weight and the ethological data were unaffected in this regard leading to a combined presentation (Tables 2 – 5).

Table 1. Live weight development of piglets of single housed sows and group housed sows (LSQ ± SE)

		Housing system	
First trial period:		Single housed	Grouped at 3
Birth	[kg]	1.4 ± 0.1	1.4 ± 0.1
Grouping day (start of trial, day14 p.n.)	[kg]	5.1 ± 0.5	5.2 ± 0.5
Day of weaning (day 49 p.n.)	[kg]	16.2 ± 1.2	16.1 ± 1.2
End of trial (day 63 p.n.)	[kg]	23.1 ± 1.5	22.9 ± 1.5
Second trial period:		Single housed	Grouped at 6
Birth	[kg]	1.4 ± 0.1	1.4 ± 0.1
Grouping day (start of trial, day14 p.n.)	[kg]	4.7 ± 0.5	4.5 ± 0.5
Day of weaning (day 49 p.n.)	[kg]	14.5 ± 1.2	15.2 ± 1.2
End of trial (day 63 p.n.)	[kg]	21.6 ± 1.6	22.5 ± 1.5

LSQ-Means without letters within row differ NOT significantly

In Table 2 it can be seen that the coefficient of variation of the litter weight remains unaffected from the three different housing systems with a minor numerical decrease when piglet age increases.

Table 2. Coefficient of variation of litter weight according to three different housing systems (LSQ ± SE)

Housing system:		Single housed	Grouped at 3	Grouped at 6
Birth	%	21.5 ± 0.01	21.2 ± 0.01	22.1 ± 0.01
Grouping day* (day14 *p.n.*)	%	22.7 ± 0.01	22.0 ± 0.01	22.0 ± 0.01
Day of weaning (day 49 *p.n.*)	%	18.7 ± 0.01	17.5 ± 0.01	18.9 ± 0.01
End of trial (day 63 *p.n.*)	%	17.8 ± 0.01	16.8 ± 0.01	18.1 ± 0.01

* Start of trial
LSQ-Means without letters within row or within column differ NOT significantly

Health status (92.3%, 92.3%, 95.2% piglets without diagnostic findings) and piglets' loss rates (2.5%, 3.4%, 1.2%) for single housed sows, sows grouped at 3 and sows grouped at 6, respectively, were unaffected from the three housing systems.

Table 3. Behaviour characteristics of lactating sows in the suckling period according to three different housing systems (LSQ ± SE)

Housing system:		Single housed	Grouped at 3	Grouped at 6
Activity	[min/2h]	33.3^{b} ± 1.8	37.3^{ab} ± 1.7	39.1^{a} ± 1.6
Sitting	[min/2h]	3.0^{a} ± 0.4	3.2^{a} ± 0.4	1.2^{b} ± 0.4
Ventral recumbency	[min/2h]	37.0^{b} ± 2.0	38.1^{b} ± 1.8	48.5^{a} ± 1.8
Lateral recumbency	[min/2h]	33.6^{a} ± 2.0	30.4^{a} ± 1.8	22.0^{b} ± 1.8
Suckling time	[min/2h]	13.0^{a} ± 0.6	11.0^{b} ± 0.6	9.4^{c} ± 0.5
Suckling acts	[n/2h]	2.3 ± 0.1	2.3 ± 0.1	2.4 ± 0.1

$^{a, b, c}$ different letters within a row denote significant differences for $p<0.05$

Table 3 shows that agitation increases with increasing group size. Furthermore, agitation decreased – at least to certain degree – with continuing suckling period (data not presented). In Table 4 it can be seen that the agonistic interactions between the sows are largely independent of the group size.

Table 4. Agonistic behaviour of group housed lactating sows in the suckling period (LSQ ± SE)

Housing system:		Grouped at 3	Grouped at 6
Chasing-up	[n/2h]	0.57 ± 0.14	0.74 ± 0.15
Cranial head butts	[n/2h]	1.34 ± 0.22	1.00 ± 0.23
Lateral head butts	[n/2h]	0.83 ± 0.19	0.71 ± 0.20
Caudal head butts	[n/2h]	0.29 ± 0.08	0.18 ± 0.08
Disturbance of suckling	[n/2h]	0.24 ± 0.09	0.49 ± 0.09
Violence against piglets	[n/2h]	0.39^{a} ± 0.09	0.13^{b} ± 0.09
Total of agonistic acts	[n/2h]	3.67 ± 0.54	3.25 ± 0.57

[a, b] different letters within a row denote significant differences for $p<0.05$

Table 5 shows that the number of agonistic acts within the housing system decreases in most cases during the suckling period (i.e. continuation of the togetherness in the group).

Table 5. Agonistic behaviour of group housed lactating sows according to different times of observations (LSQ ± SE)

Housing system:		Grouped at 3	Grouped at 6
Grouping day			
Chasing-up	[n/2h]	0.95^{x} ± 0.20	1.27^{x} ± 0.22
Cranial head butts	[n/2h]	1.86^{x} ± 0.32	1.85^{x} ± 0.35
Lateral head butts	[n/2h]	0.78 ± 0.27	1.37^{x} ± 0.29
Caudal head butts	[n/2h]	0.38 ± 0.11	0.34 ± 0.12
Disturbance of suckling	[n/2h]	0.42^{x} ± 0.13	0.73^{x} ± 0.14
Violence against piglets	[n/2h]	0.48 ± 0.12	0.25 ± 0.14
Total of agonistic acts	[n/2h]	4.86^{x} ± 0.78	5.80^{x} ± 0.86
Middle of suckling period			
Chasing-up	[n/2h]	0.20^{y} ± 0.19	0.21^{y} ± 0.19
Cranial head butts	[n/2h]	0.83^{y} ± 0.30	0.15^{y} ± 0.31
Lateral head butts	[n/2h]	0.89^{a} ± 0.26	0.05^{by} ± 0.26
Caudal head butts	[n/2h]	0.20 ± 0.11	0.02 ± 0.10
Disturbance of suckling	[n/2h]	0.07^{y} ± 0.12	0.25^{y} ± 0.12
Violence against piglets	[n/2h]	0.30 ± 0.12	0.01 ± 0.12
Total of agonistic acts	[n/2h]	2.49^{y} ± 0.74	0.69^{y} ± 0.75

[x, y] different letters within a column (within the same housing system and for the same agonistic behaviour) denote significant differences for $p<0.05$ between the observation days
[a, b] different letters within a row denote significant differences for $p<0.05$ between different housing systems

Discussion

The effect of improved post-weaning weight gain of already pre-weaning grouped piglets (D´Eath 2004) could not be confirmed (Table 1). Spreading of litters' live-weight development (Wülbers-Mindermann 1992) is refuted by the missing variation of the litter weights' coefficients of variation (Table 2). Further, the results do not confirm the negative effect of group suckling on health status and loss rates, supposed by Weber (2001). The increasing rate of ventral recumbency, the decreasing rate of relaxation-indicating lateral recumbency and the decrease of suckling time (Table 3)

stand for a higher rate of acticity and disturbance in group suckling systems. The nearly same level of agonistic behaviour rates between sows grouped at three or grouped at six indicates that both group sizes are practicable. However the behaviour-related results (Table 3-5) emphasize that there were behavioural adaptations of the sows but these adaptations did not negatively affect the piglets live weight gain, health status and loss rates.

It is concluded that group housing is practicable for organic lactating sows. The strict obedience of the above mentioned grouping rules (≤ 5 days between piglets' grouping age, no grouping of diseased sows and no primiparous sow alone with multiparous sows) is essential for a successful implementation.

Suggestions to tackle the future challenges of organic animal husbandry

The present paper will contribute to improve animal welfare in organic animal production systems.

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