

The effects of two floor space allowances on growth parameters and welfare of Italian heavy pigs



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INTRODUCTION

- EC Directive 2008/120 on pig protection states that “the accommodation must allow the animals to rest and get up normally and to lie down at the same time”
- Minimal floor space allowance for pigs weighing more than 110 kg is 1 m²/head, but no further provision is made for heavier animals like Italian heavy pigs intended for PDO (Protected Designation of Origin) productions, which must be slaughtered at 160 kg BW or more.
- Several reports suggest that the floor space requirement of pigs varies in proportion to the body weight and that floor space allowance can affect productive parameters and welfare.

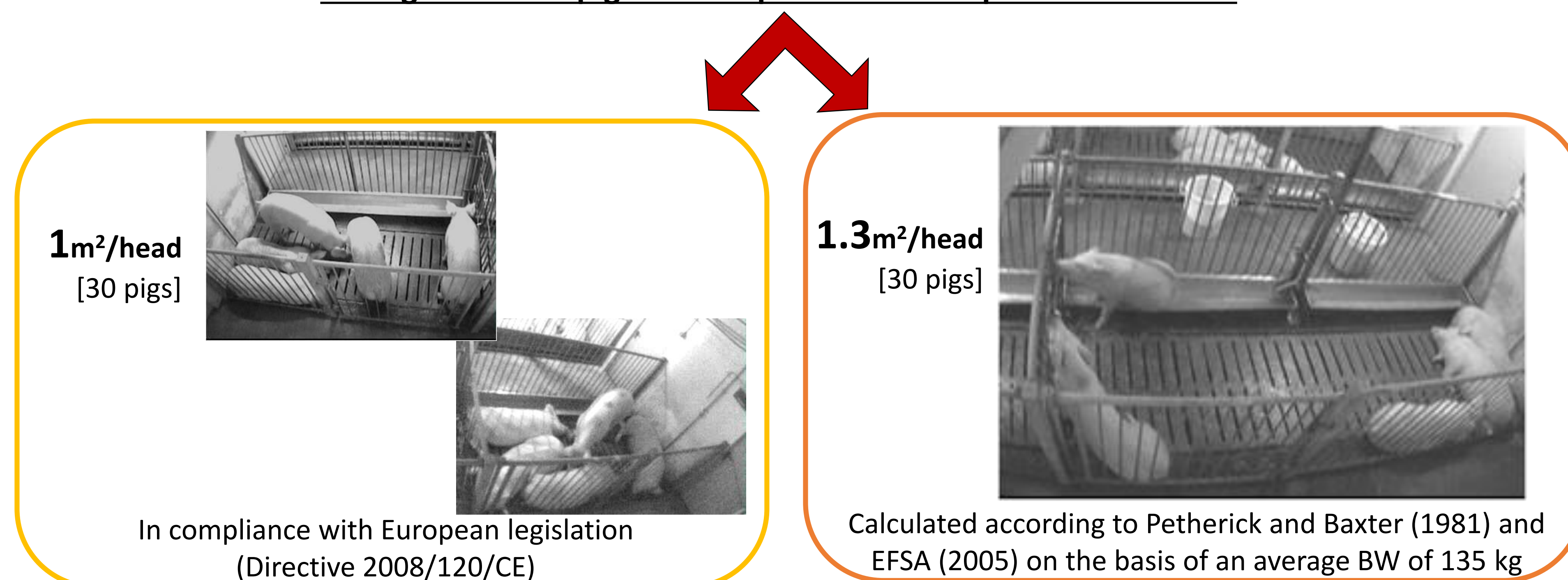
OBJECTIVE

The aim of the present trial was to investigate the effects of two different space allowances (1 and 1.3 m²/head) on heavy pigs growth parameters, behaviour and on the main qualitative characteristics of their carcasses and the meat they produce.

MATERIALS AND METHODS

60 hybrid (Landrace x Large White x Duroc) barrows (initial average BW: 24 kg) were raised in collective pens (5 pigs/pen), on a totally slatted floor and fed the same, rationed diet up to the slaughtering BW of 160 kg (215 days of trial – approximately 280 days of age).

During their lives pigs were kept at different space allowances:



Data collection: Between 100 and 160kg BW animal behaviour was weekly videotaped over the light hours (10 hrs/day, from 8:00 a.m. to 6:00 p.m.) and analyzed with a scan-sampling technique. Growth parameters were recorded. On slaughtering, carcass and meat quality (lean meat yield, pH of *Semimembranosus* -SM- muscle at 45' and 24 h post mortem) were assessed.

Statistical analysis: data obtained were submitted to ANOVA using floor space allowance as the main effect.

RESULTS AND DISCUSSION

Experimental conditions did not influence the pigs' health and no occurrence of significant lesions was observed. The effects of floor space allowance on pig behaviour, growth performances and meat quality are shown in table 1 and 2.

Table 1 – Behaviour (Data are expressed as percentage of total observed behaviours)

Floor space allowance	1 m ² /head	1.3 m ² /head	SE	P-value
Standing inactive	0.16	0.16	0.034	n.s.
Sitting inactive	2.83	3.42	0.240	n.s.
Lateral recumbency	29.35	35.35	0.907	<0.001
Sternal recumbency	33.74	32.34	0.757	n.s.
Total recumbencies	63.09	67.69	0.888	<0.01
Eating	8.89	9.16	0.610	n.s.
Walking	0.03	0.082	0.107	n.s.
Aimless exploring of pen floor	22.01	15.03	0.017	<0.001
Social Interactions	2.18	3.08	0.703	n.s.
Other (drinking, walking and standing)	1.01	1.63	0.115	<0.01

All pigs spent most of their time resting. The floor space allowance of 1.3m²/head permitted all the pigs to lie down in lateral recumbency at the same time and resulted in an increase of lateral recumbency. The greater amount of time spent in an aimless exploration of the floor by pigs kept at 1m²/head was probably because of their frequent inability to lie down in lateral recumbency due to lack of available floor space, as observable from the photographs above.

Table 2 – Growth performances, carcass and meat quality

Floor space allowance	1 m ² /head	1.3 m ² /head	EMS	P-value	
Body Weight (kg)	Initial (d0)	23.8	23.9	17.7	n.s.
	d 139	100.4	104.3	49.7	n.s.
	Final (d 215)	148.3	156.4	84.5	<0.02
Average Daily Gain (kg/d)	d 0-139	0.55	0.58	0.001	n.s.
	d 140-215	0.63	0.69	0.008	<0.03
	Overall ADG (d0-215)	0.58	0.62	0.003	<0.01
Feed Conversion Ratio	d 0-139	3.13	3.10	0.05	n.s.
	d 140-215	4.99	4.61	0.08	<0.05
	Overall FCR (d0-215)	3.92	3.71	0.01	<0.01
Dressing out %	83.0	83.5	1.74	n.s.	
Fat thickness (mm)	22.6	24.0	9.60	n.s.	
Lean meat %	52.6	51.7	5.44	n.s.	
pH 45min. SM	6.53	6.50	0.07	n.s.	
pH 24h. SM	5.79	5.73	0.03	n.s.	

Keeping animals at higher space availability resulted in significantly improved productive parameters (in particular higher BW, better overall ADG and FCR). No significant differences were observed between the groups as concerns carcass and meat quality.

CONCLUSIONS

An individual floor space allowance of 1.3 vs. 1 m²/head did not modify the main qualitative characteristics of carcasses and meat of Italian heavy pigs (160 kg BW). At a space allowance of 1.3 m²/head animals could lie down simultaneously, even in lateral recumbency. If we consider that pigs are biologically structured for long periods of rest or inactivity throughout the day, a lack of rest could have a negative impact on their welfare. In addition to this it is worth noting that heavy pigs given 1 m²/head showed an increase in aimless explorative behaviours (exploring-pseudorooting directed towards the pen structures), *i.e.* they likely became restless because they were unable to lie down all at the same time. Furthermore, productive parameters were significantly improved when pigs were given more space allowance. It is hoped that further research will be carried out to evaluate the joint effects of floor space allowance and group size on heavy pig behaviour and productive performance, and that these result may represent a first step towards the definition of minimum requirements in terms of space allowance for pigs weighing more than 110 kg.

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