How do deep bedded systems affect animal welfare and consumers' perceptions of animal welfare?

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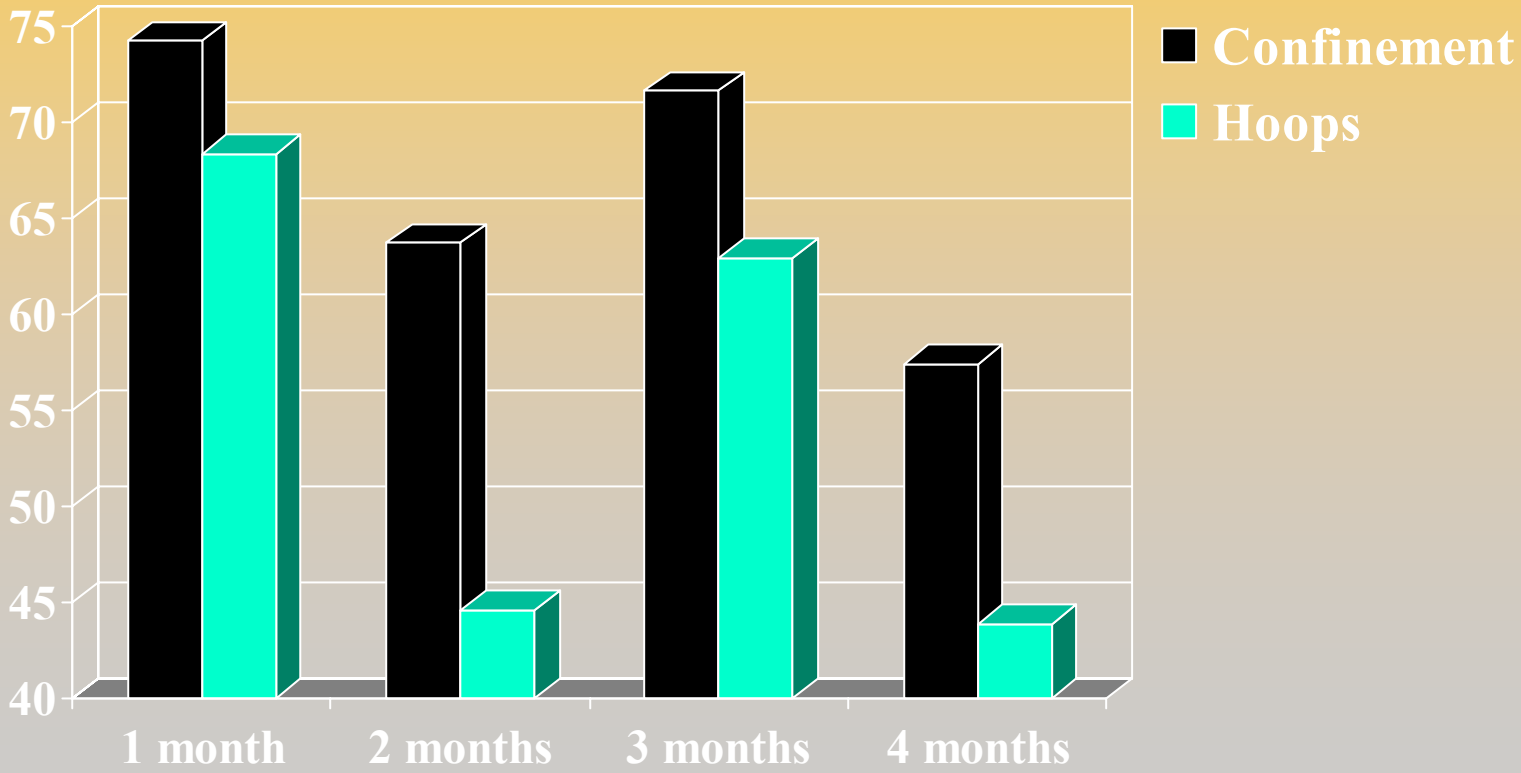
Hoop Housing:

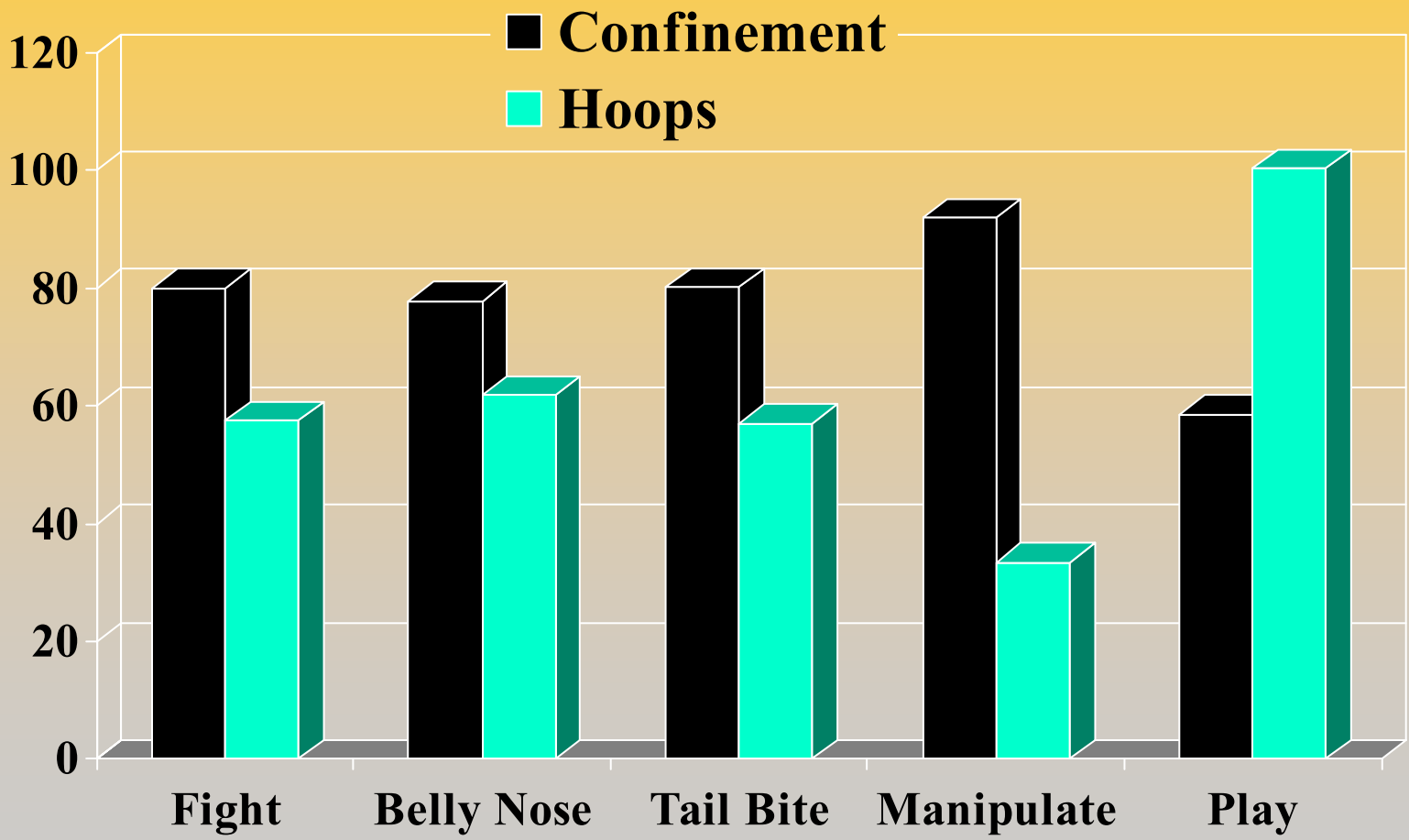
- **Four experiments were conducted, 2 in winter and 2 in summer**
- **“Hoop” pigs were housed in one of 3 hoop structures (n = 150/hoop)**
- **These pigs were provided with 1.1m^2/each**
- **Bedded with bales of corn stalks**
- **Open floor area (5.5 x 9.1 m) for feeders and waters.**

Percentage of Pigs Resting



P < . 027

What do they do when they are active?



P < .03

Summary

- **Hoops pigs:**
  - **performed fewer abnormal behaviors**
  - **had lower plasma cortisol concentrations**
  - **greater rate of play behavior**
  - **fewer leg injuries**
- **Thus indicating they had better welfare**

More Experiments

- **Although the occurrence of aberrant behaviors occurred, they were low.**
- **Because hoop raised pigs are subjected to fluctuating environmental temperatures, the next study was conducted to quantify any change in behavior which occurred as winter temperatures progressively grew colder.**

Procedures:

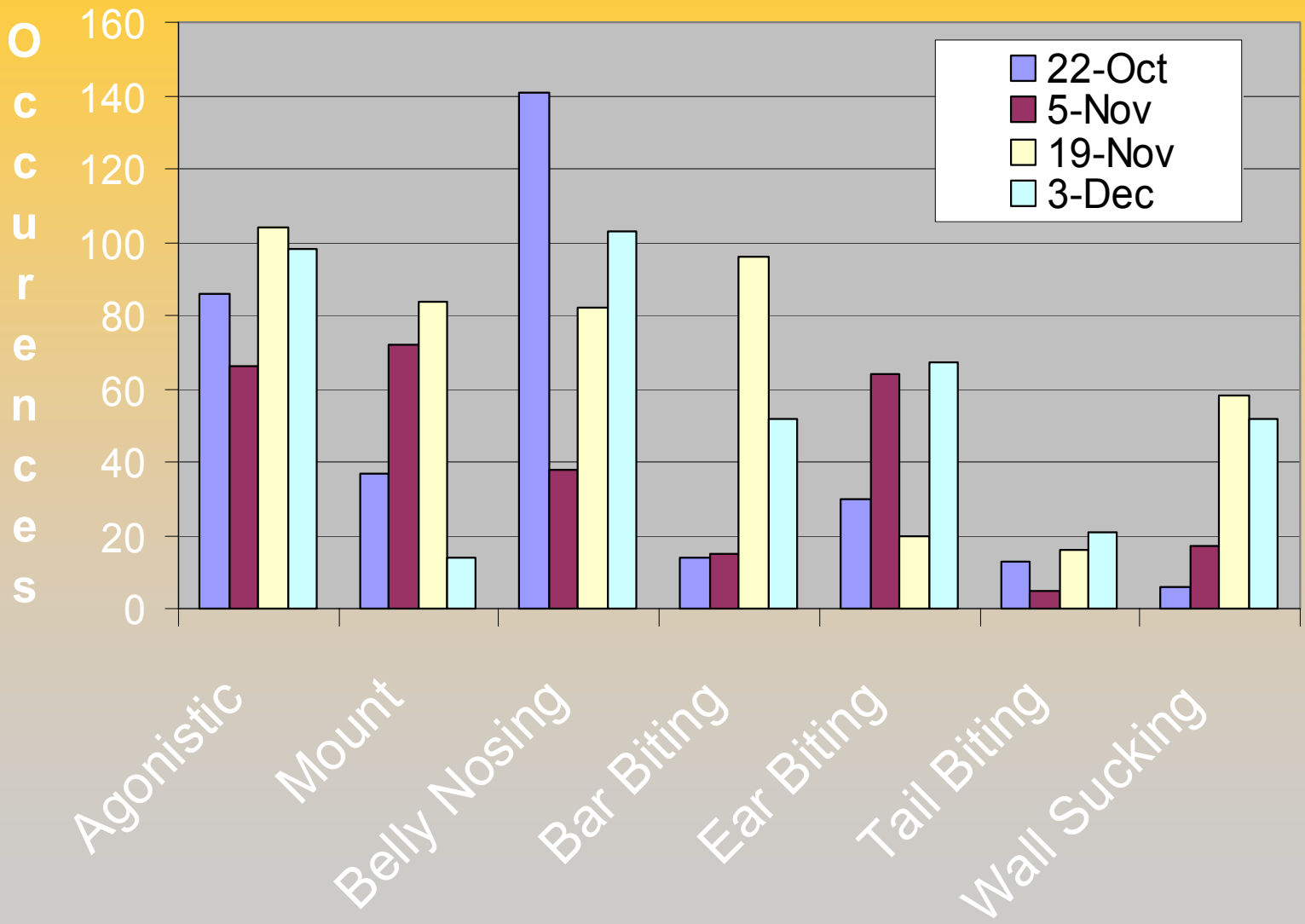
- **Pigs in one of three hoops, each with 120 pigs were observed**
- **Bedded with bales of corn stalks**
- **These pigs were provided with 1.1m^2/each**
- **Open floor area (5.5 x 9.1 m) for feeders and waters.**
- **Behaviors such as bar-biting, wall sucking, belly nosing, and agonistic actions were recorded.**

Procedures, cont.:

- **Two feeders provided 12 feeder spaces each**
- **Two waters provided 2 water spaces each**
- **When bedding started to become wet, new bedding was added upon the existing bedding.**

Behavioral Observations:

- **Pigs in the three hoops were observed by trained observers.**
- **Observations were conducted during four, 1-wk periods, from October to December.**
- **Each pen was observed for 15 minutes, every 1.5 hours for four observations in a given day.**
- **Temperatures ranged from –1.1^0 to 47^{0}C.**

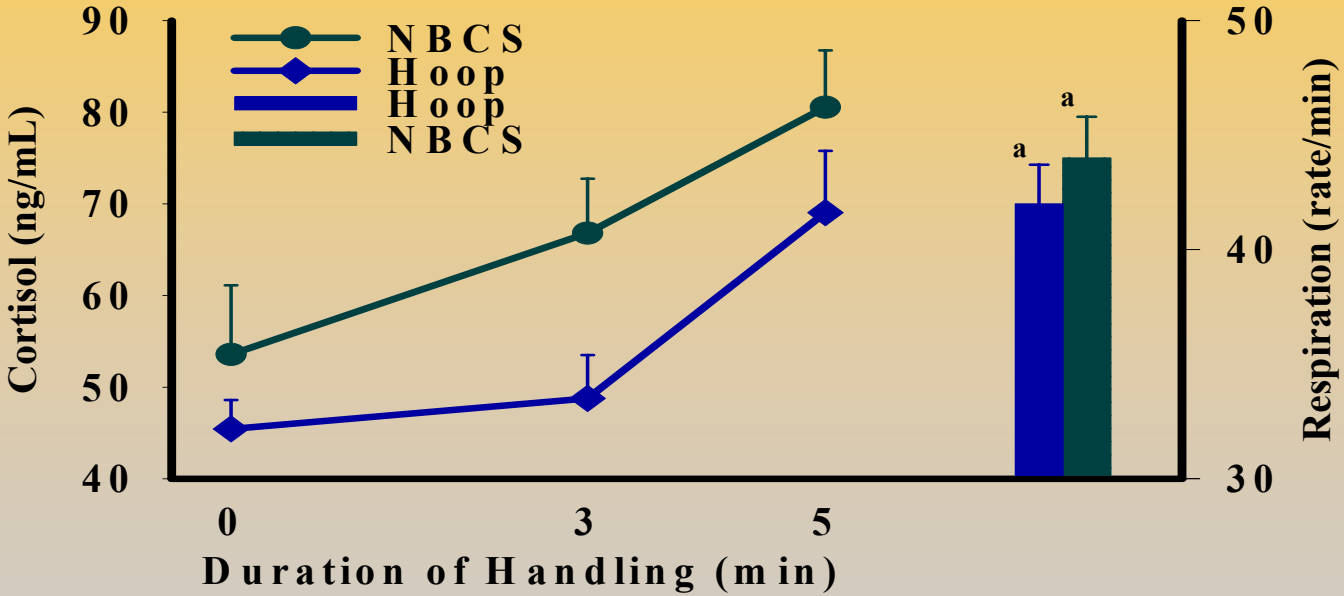

Occurences
160
140
120
100
80
60
40
20
0
22-Oct
5-Nov
19-Nov
3-Dec
Agonistic
Mount
Belly Nosing
Bar Biting
Ear Biting
Tail Biting
Wall Sucking

Behavior of pigs during a 5-minute stress test which consisted of herding the pigs in a .61 x 21.3 meter alley.

Behavior (rate)	NBCS	Hoop
Grunt	7.5±1.8[a]	44.3±8.0[b]
Squeal	3.8± .9[a]	10.8±1.9[b]
Urinate	.1± .1[a]	.4± .2[a]
Defecate	.6± .2[a]	1.3± .3[a]
Laps	6.0± .5[a]	4.5± .3[b]

$P < .02$

Plasma Cortisol Concentrations and Respiration Rate During a 5-min Handling Stress



Summary

- **While bar-biting and wall-sucking increased during the study period, agonistic behavior and belly nosing did not change during the study.**
- **Both temperature and age may play significant roles in the occurrence of these behaviors.**

Conclusions

- **Although the rate of some behaviors increased during the study period, these means are low.**
- **Further research to identify characteristics of those individuals performing these behaviors may lead to strategies to optimize their welfare.**

Summary of Previous Research

- **Hoops require an active management strategy**
- **Attention to:**
  - **bedding requirement**
  - **feeding/watering systems**
- **Hoop housing meets the pigs needs much better than dirt lots.**
- **Implications of aberrant behaviors on production and health need evaluation.**

Research by R. Sargent (2001)

Winter:Deep Litter = 200 pigs/pen:Conventional = 20 pigs/pen

Behavior	Deep-Litter	Conventional
Locomotor	10.4 %	2.0%
Mouth Pen	9.4	4.6
Social action	8.3	3.7
Agonistic	4.3 %	.7 %
Sexual	1.8 %	.6 %

- Each behavior is different between treatments $P < .05$.

Research – Grow/Finish

- **Comparison of Genotype x Housing (Guy et al., 2002)**
  - **More tail biting in fully slatted compared to straw yards.**
  - **Confounded with amount of space.**
- **Analysis of lying behavior (Ekkel et al., 2003)**
  - **Pigs require .033 x bodyweight$^{.66}$ = m^2**
  - **i.e. 100 kg pig needs .76m^2**
  - **This translates to 8.41ft^2 and finishing pigs typically get 7.5ft^2**
- **Kornegay and Notter (1984) provide data which indicate that daily gain continues to increase when pigs are given increasing space from .2 all the way to 1 m^2**

Research – Sow

- **Nesting is a need which when prevented decreases welfare (Jensen and Toates, 1993).**
  - **When prevented, sows have:**
    - **increased heart rates**
    - **increased stereotypic behaviors (Damm et al., 2002)**
- **'Loose' house vs. stall house gestation (Boyle et al., 2002).**
  - **Stall housed sows**
    - **More lesions**
    - **Less maneuverability**
    - **More restless during farrowing**

Research - Sows

- **Effect of adding wood shavings to pens (Leeuw et al., 2003).**
  - **Decreased sham chewing**
  - **Decreased pen manipulation**
  - **Decreased teeth grinding**
  - **Decreased plasma cortisol**

- **Putting feed in substrate to encourage foraging had no effect.**

Research - Sows

Group housed sows and floor space (Weng et al., 1998).

	Pen Area (m^2/sow)			
	2	**2.4**	**3.6**	**4.8**
Total Lesions	**129.4[a]**	**72.4[b]**	**57.0[c]**	**53.1[c]**

Concluded that a minimum of 2.4 to 3.6 m^2 required to promote good welfare.

[a,b,c] P < .001; Appl. Anim. Beh. Sci.

Confounding

- **Many Factors:**
  - **bedding**
  - **temperature**
  - **space**
  - **group size**
  - **etc.**