

# The Crate

(stall, case, cage, box, etc.)

*-- Its History and Efficacy*

John J. McGlone, PhD  
Pork Industry Institute  
Texas Tech University  
Lubbock, Texas

# Outline

- What is a crate?
- History of the Gestation Crate
  - In the pig-specific media
  - Use on today's farms
- Comparison with Group Housing
  - Productivity
  - Behavior
  - Health, Immunity and Endocrine
  - New research on trickle feeding penned gilts/sows

# The Gestation Crate

Measurements should be taken in two ways:

1. Center-Center
2. Inside space

Water: either individual ad libitum or watered in “meals”

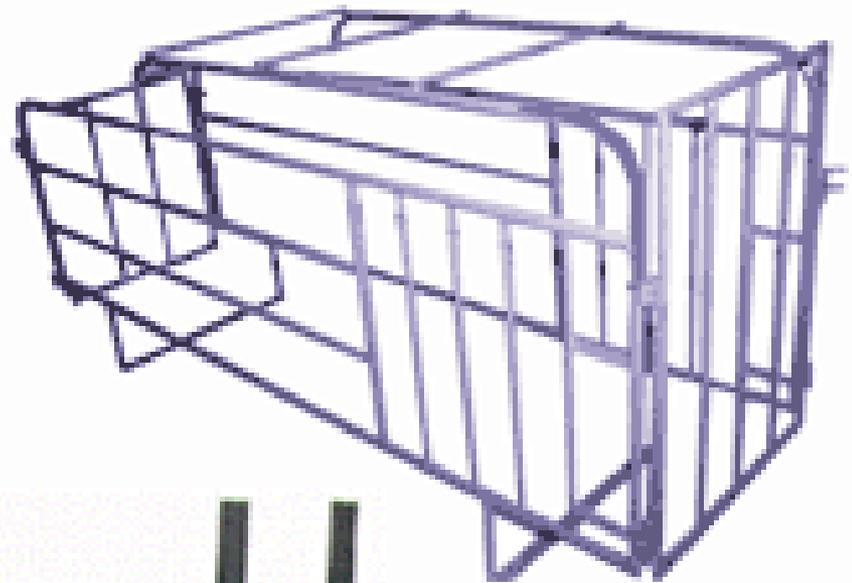
Width  
19-26”  
←→  
24”

Length

7’  
6.5-8’

Feed trough either above or below the floor level





“... 22" and 24" models available to fit your building requirements...”

# Why use crates?

- They get the most sows in a given space in a building (better asset utilization)
- They allow for control of individual sow feed intake – you can feed the fat ones less and the lean ones more
- They allow for lower feed intake due to control of the thermal environment and lack of activity
- They prevent social stress
- They protect the workers
- They allow for planned placement of manure in a defined and small location (behind the sow)

# What are the “problems” with the crate?

- Public perception is negative
- Sows can not turn around
- Large sows can not make full, unrestricted “normal postural adjustments” in a 2’ X 7’ crate
- Sows can not socially interact
- Sows’ ONF behavior (such as bar biting) are more obvious
- Sows are limit fed (they are often hungry)
- Sows may have an uncomfortable floor if it is not bedded
- Sow mortality is too high
- Shoulder lesions are common

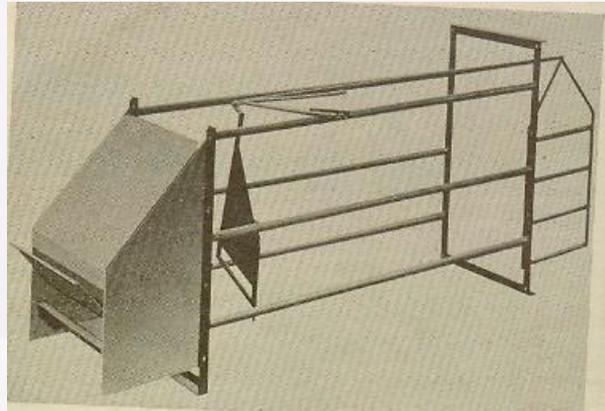
# Sow ONF Behaviors

- Cause for consumer concern
- Mechanism: unknown
- May be a stress-induced behavior
- May be a normal behavior expressed regardless of the environment



# USA History of Gestation Crate

- 1960's:  
Gestation crates experimented with on farms, ex., Lubbock Swine Breeders, T. Euel Liner & Roy Poage put first sows in crates in 1964/1965. These crates had a sand area behind sows could be let out occasionally. By 1969, some sows were continuously confined during gestation.
- Through the 1970's, feeding stalls are advertised (but not crates)

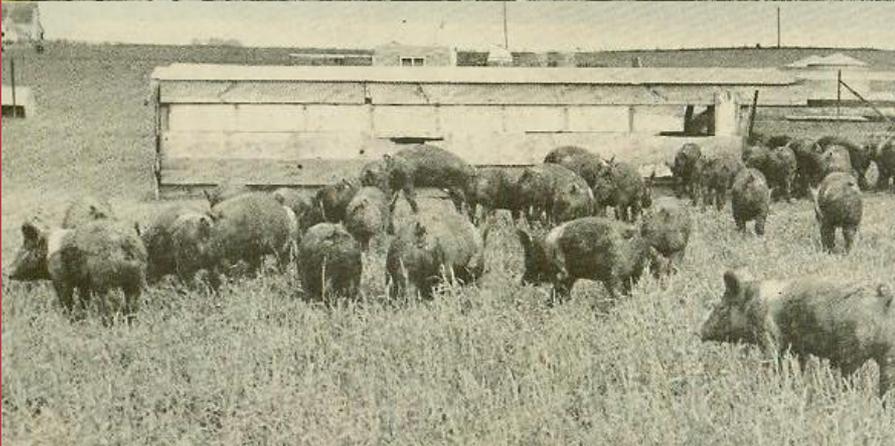


“new” in March, 1971

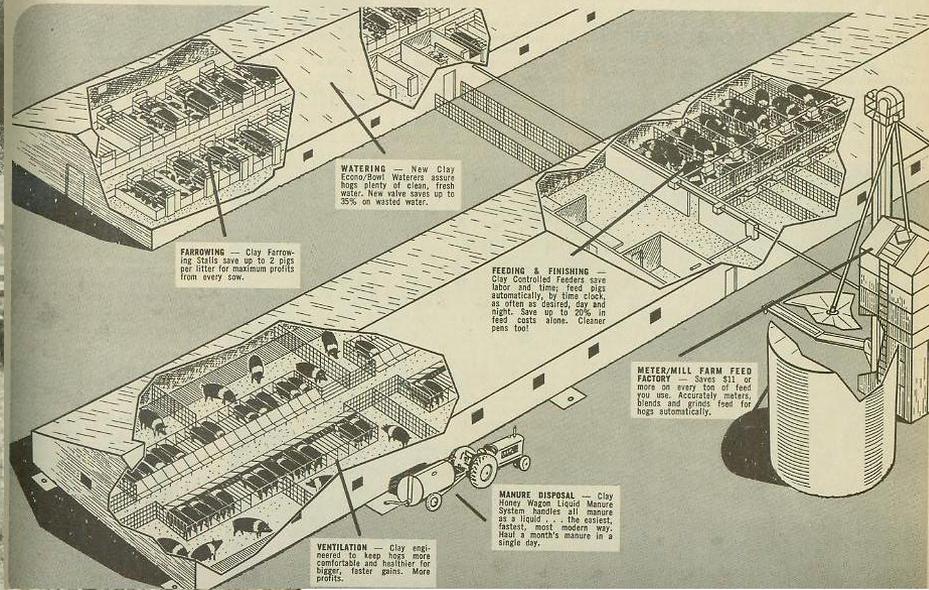
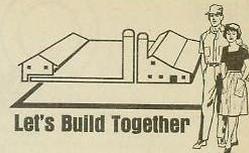
# What was the Gestation Housing like in 1968-1971 in the Pork Press?

Pasture ---- or ---- Indoor group housing

## Keppys—Pasture Specialists

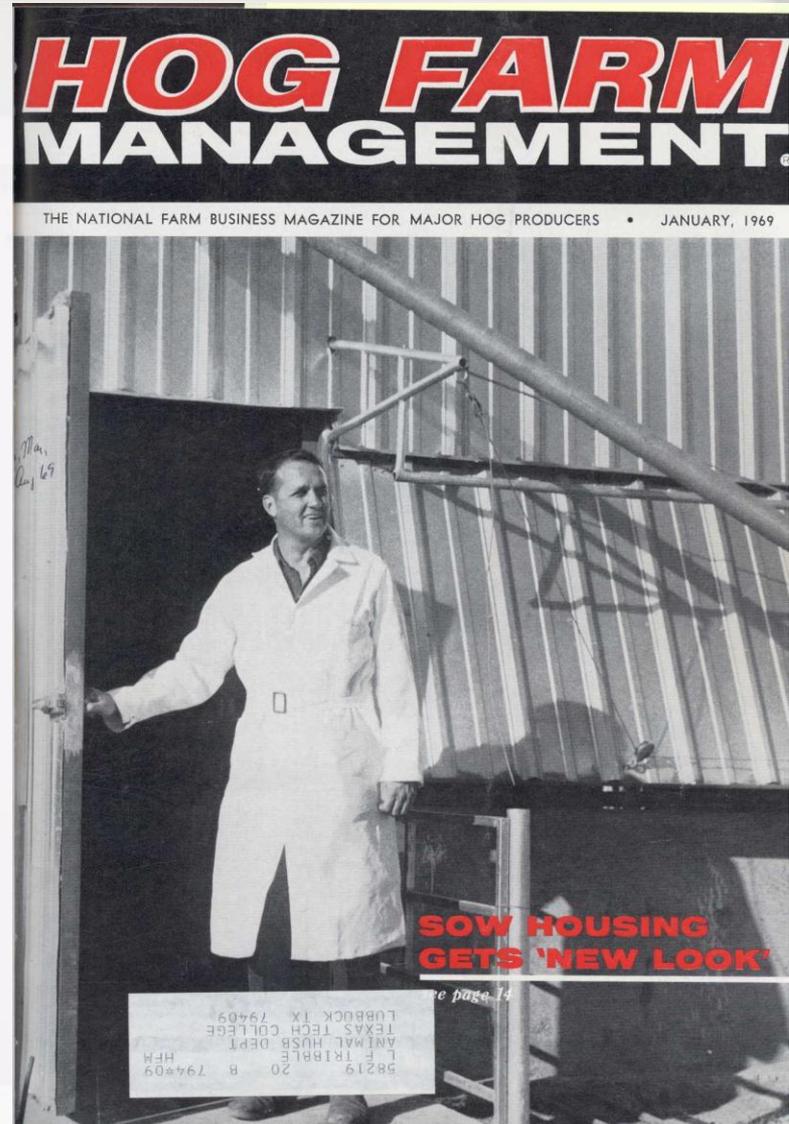


Clay shows you how to market 1,000 hogs a year without hired help!



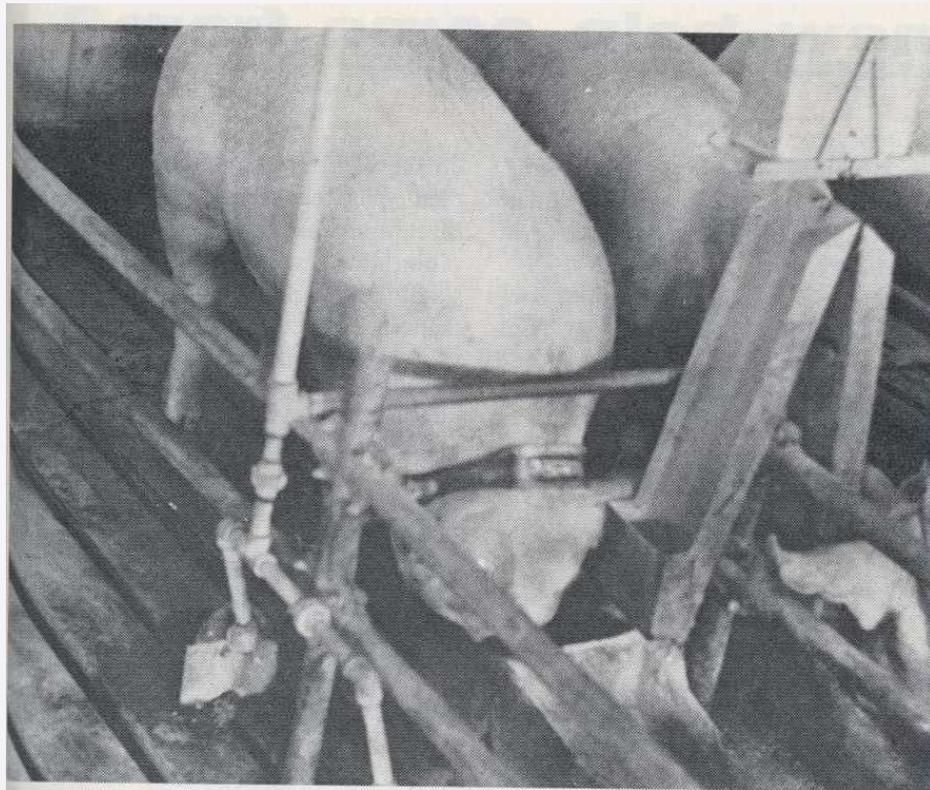
# USA History of Gestation Crate

- January, 1969 Roy Poage of Lubbock Swine Breeders discussed partial (part-time) confinement of sows during gestation in Hog Farm Management (no longer published).



# USA History of Gestation Crate

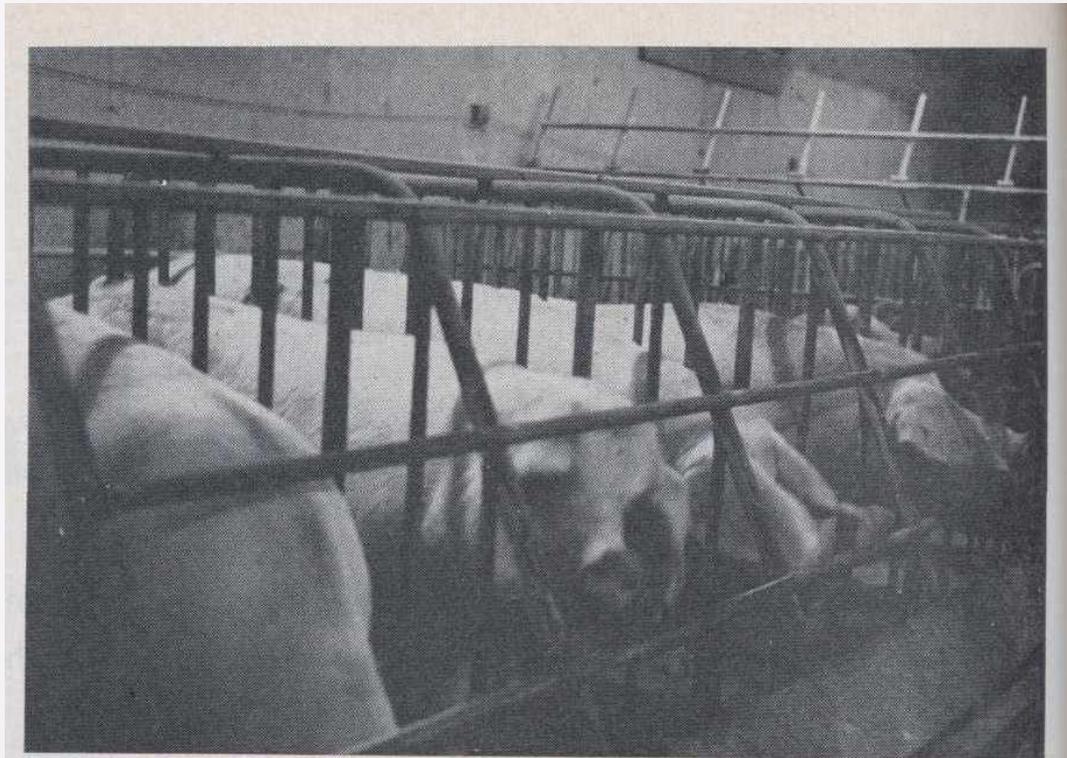
- February, 1969 first use of a tether in Hog Farm Management (no longer published).



*SOWS usually become used to the tie stalls quite quickly. As sows are always isolated, social problems are eliminated and complete control of feed intake is possible.*

# USA History of Gestation Crate

- December, 1969 first use of a crate in Hog Farm Management (no longer published).

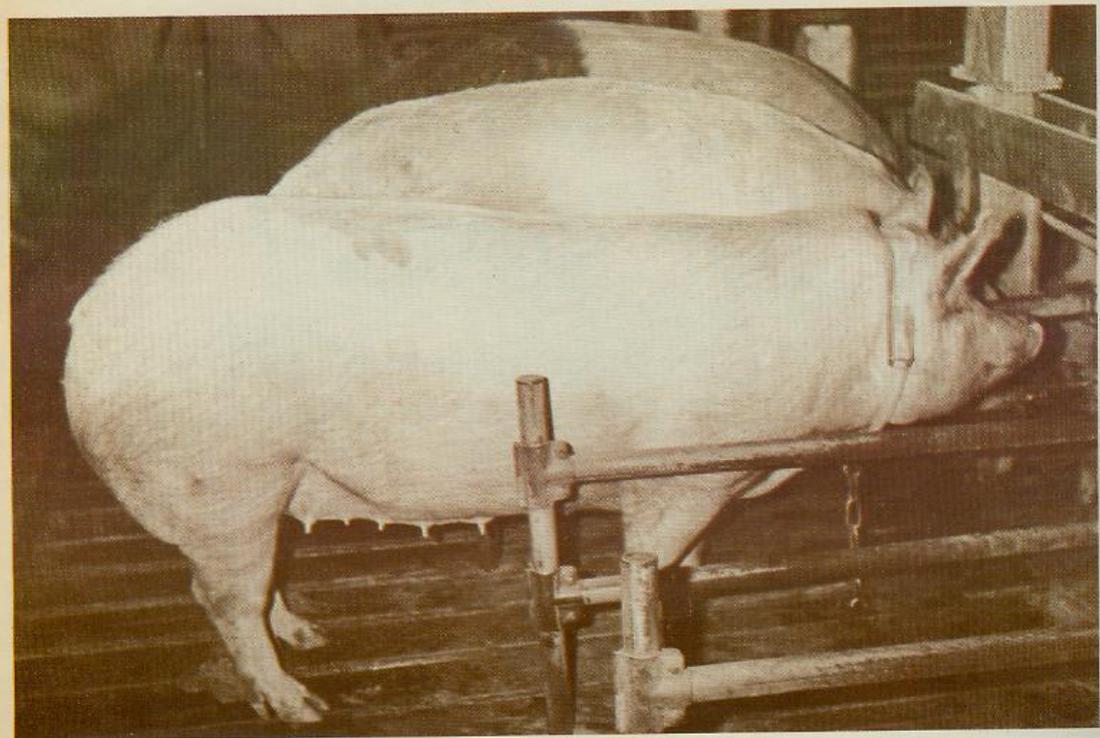


*SOWS to be bred at Jet Age Swine Inc., are kept in holding crates which face boar holding pens. At signs of estrus, sows are moved to breeding pens. After breeding, they are kept in sow holding pens.*

# USA History of Gestation Crate

- September, 1970 first use of a tether in National Hog Farmer (NHF) magazine

## Hoosier Seeks Full-Shouldered Confinement Hog, Not Show Winner



# USA History of Gestation Crate

- May, 1971, first picture of a gestation crate in Michigan in NHF

## Michigan State Sow Gestation Test House Flushed Out When Tub Flops Over

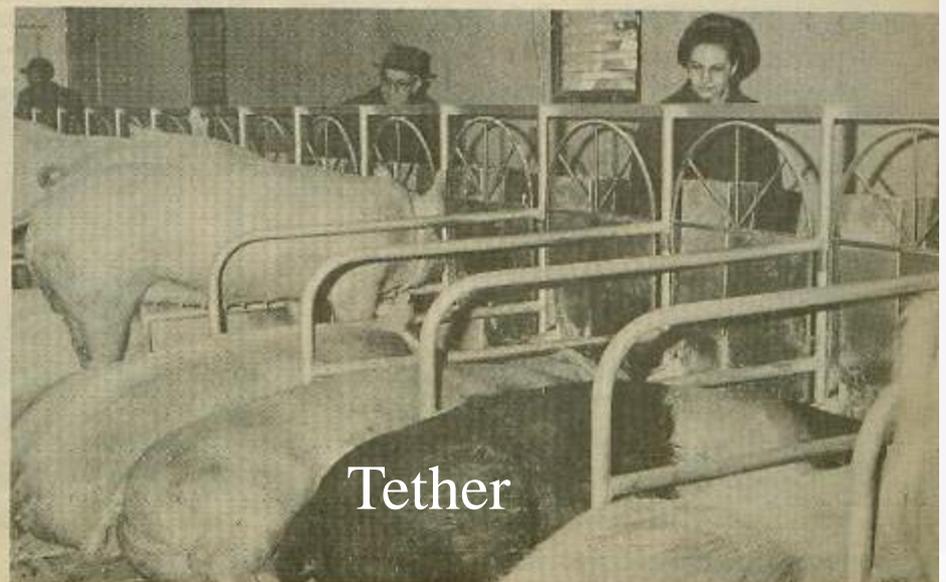
ends of the  
tions throw  
the center

nd sows is on test in confinement stalls in the Michigan  
itation house.

Across the slat section is another row of 20 females on test in tie stalls. Another  
section of gestation house will test loose housing, with five sows in one pen.



Crate



Tether

# USA History of Gestation Crate

- February 15, 2000  
Gestation Crates  
make the cover of  
NHF

CURR  
PERIOD.  
3F  
391  
126  
15:2  
February  
15, 2000

88

# National Pork Farmer

February 15, 2000

The Pork Business Authority

PRIMEDIA Publication

## Breeding Herd Efficiency

\*\*\*\*\*  
#BXNCFQ \*\*\*\*\* MIXED ADC 55228  
#3026569# 0200 NHF N 0000 0114  
SERIALS MAINTENANCE  
TEXAS TECH UNIV LIB  
PO BOX 40002  
CORPUS CHRISTI TX 78409  
LUBBOCK TX 79409

Probing Sow Losses / 12  
Boar Stud Achieves  
Top Quality Standard / 18

# USA History of Gestation Crate

...and an associated problem

February 15, 2000

National Hog Farmer

breeding herd efficiency

by Joe Vansickle, Sr. Associate Editor

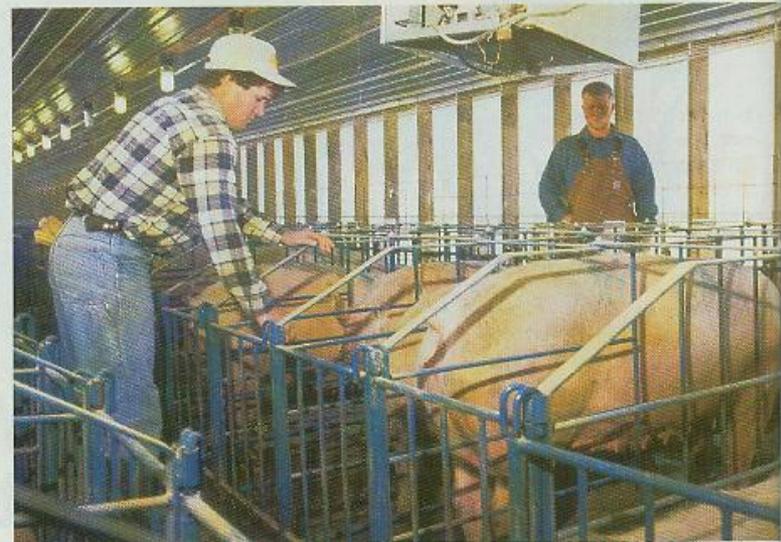
## Sow Mortality Rising

**Sow losses climbed from single digits to an annual rate of 10-15% in some herds during the '90s. The cause of the escalating mortalities is multi-faceted.**

**A** variety of factors linked to reproductive physiology, sow management and herd size appears to have triggered a sharp rise in sow mortality in U.S. herds.

The cause of rising breeding female mortality seems to be from two groups, replacement gilts rushed into a breeding herd and sows kept past their prime.

This issue is a real problem and an increasing expense on most sow farms,



But....

the gestation crate  
was not a new idea

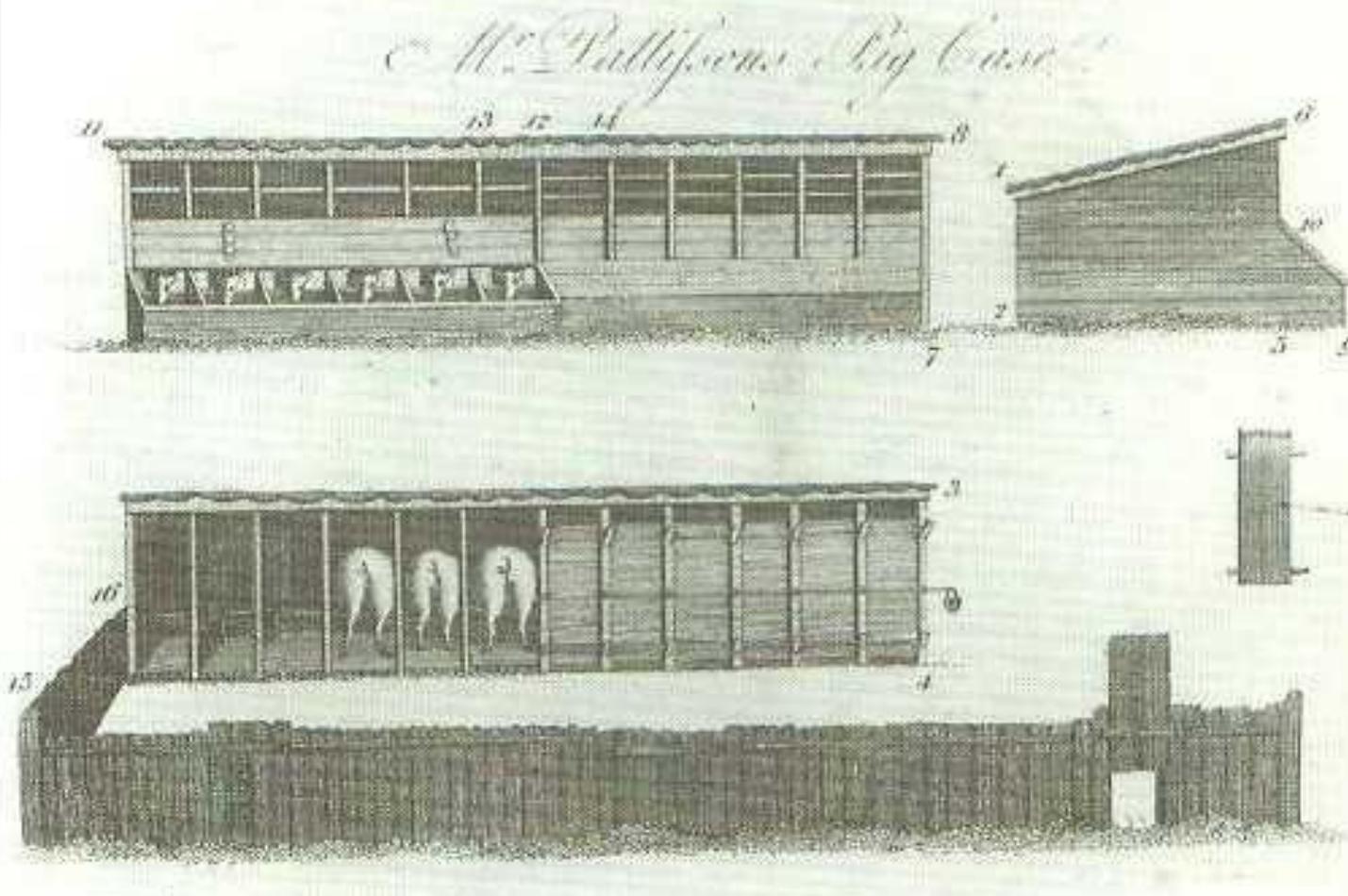


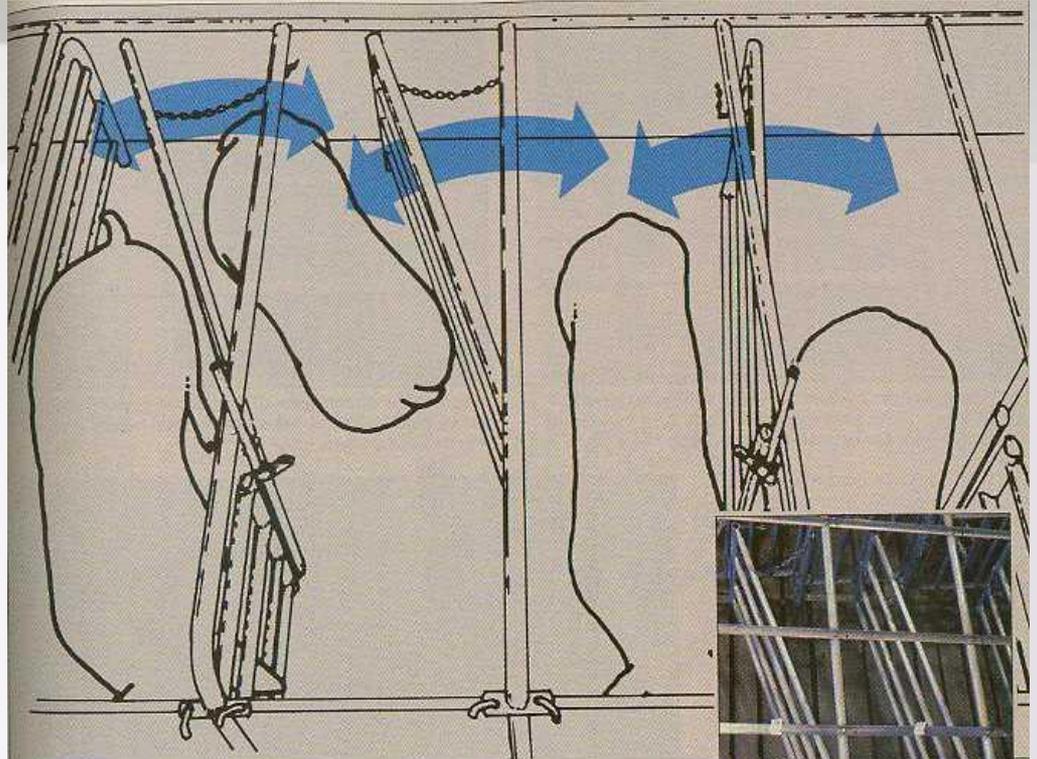
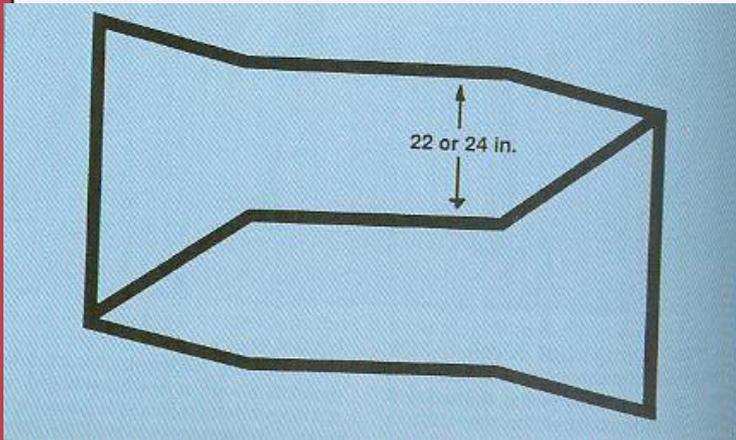
Plate 2.1 Mr Pattison's pig cases  
Mr. Pattison's pig cases, 1807 Essex, England. S. Baxter, 1984.

“...each to contain a pig, and to fit him as near as may be when he is in, he cannot attempt to turn himself round...”

Arthur Young, 1807. In Baxter, 1984.

# Variations on the standard Crate

- In the turn-around crate, the sows share turning around space
- In the Compartment-style, the wide end permits turning



**Where does the Gestation  
Crate stand today in the USA?**

# USA Pork Producers

- Top 10 USA pork producers have about 1.8 million sows and they market over one-third of all pork – over 90% of the sows are in gestation crates
- 83% of sows farrow in total confinement facilities (USDA-NAHMS, 2000);  
*The use of gestation crates was not determined*
- The gestation crate is the most common gilt/sow housing system among gestation types of facilities

# What does the Public Think?

- Many animal activist groups are opposed to the gestation crate in the USA (see HSUS, PETA, AWI, HFA, Farm Sanctuary, etc.)
- Europe has banned use of the crate in new facilities after Jan 1, 2003 and in all facilities as of Jan 1, 2013.
- Food retailers are questioning the use of the gestation crate.

# Industry changes

- Florida, Arizona, Oregon, Colorado, California have banned the gestation crate
- Smithfield announced in Jan 2007 they will phase out the gestation crate; in 2009 they said the phase-out will be delayed until financial times are better
- Alternative “humane” products do not use the gestation crate

... Marc Kaufman, Washington Post staff writer, Monday, June 18, 2001), National Pork Council Vice-President and veterinarian Paul Sundberg was quoted as follows:

**"Science tells us that she [a sow] doesn't even seem to know that she can't turn...She wants to eat and feel safe, and she can do that very well in individual stalls."**

Such statements demonstrate the industry's ongoing attempts to justify to an uneasy public the methods currently employed in factory farming operations, including gestation crates.

**However, there is a rising tide of protest against these methods.**

Farm Sanctuary, 2002

Bancruelfarms.org, 2002

**What do the scientific papers  
say about the crate?**

# Hypothesis

Early gilts (1950-1990) were not adapted to the crate; intense selection created a gilt/sow that would have normal reproduction in the crate

# Early work -- 1969

- England and Spur, 1969. Litter size of swine confined during gestation. *J. Anim. Sci.* 28:220-223.
  - No difference in litter size between gilts/sows in crates (2 X 7') and pens
  - 28% of the gilts failed to express normal estrus in crates compared with 16% in group housing
  - 17% of gilts failed to breed in the crates, compared with only 6% of gilts in group housing

# 1985 study

- Schmidt, W. E., J. S. Stevenson and D. L. Davis. 1985. Reproductive traits of sows penned individually or in groups until 35 days after breeding *J. Anim. Sci.* 60:755-759.
  - No difference in litter size between gilts/sows in crates (19.5" X 7') and pens
  - 12% better farrowing rate for group-penned sows compared with crated sows (66 vs. 78%,  $P < 0.05$ )

# Individual vs. group housing systems

(Backus, 1997)

	Crate	Free-access stalls	ESF	Trickle
Pigs born alive	10.7	10.9	11.0	10.7
Pigs/sow/year	22.1	22.5	22.1	22.2
Skin lesions, %	0.3	6.5	33.0	18.9
Feet & Leg problems, %	8.4	10.4	19.5	17.8
Oral activity, %	32.4	20.4	9.4	26.7

# Ten studies showing (more or less) no differences in productivity between crates and other sow housing systems

- Backus, G. B. C., I. S. Bokma, T. A. Gommers, R. De Koning, P. F. M. M. Roelofs and H. M. Vermeer. 1991. Farm systems with cubicles, tethered sows and group-housing. Report P1.61, pp 1-7. Research Institute for Pig Husbandry, Rosmalen, the Netherlands.
- Backus, G. B. C., H. M. Vermeer, P. F. M. M. Roelofs, P. C. Vesseur, J. H. A. N. Adams, G. P. Binnendijk, J. J. J. Smeets, C. M. C. van der Peet-Schwering and F. J. van der Wilt. 1997. Comparison of four housing systems for non-lactating sows. Report P5.1, pp 4-12. Research Institute for Pig Husbandry, Rosmalen, the Netherlands.
- Barnett, J. L., G. M. Cronin, C. G. Windfield and A. M. Dewar. 1984b. The welfare of adult pigs: The effects of five housing treatments on behaviour, plasma corticosteroids and injuries. *Appl. Anim. Behav. Sci.* 12:209-232.
- Barnett, J. L., C. G. Winfield, G. M. Cronin, P. M. Hemsworth and A. M. Dewar. 1985. The effect of individual and group housing on behaviour and physiological responses related to the welfare of pregnant pigs. *Appl. Anim. Behav. Sci.* 14:149-161.
- Cariolet, R., C. Vieuille, P. Morvan, F. Madec, M-C. Meunier-Salaun, J. C. Vaudelet, V. Courboulay and J. P. Signoret. 1997. Evaluation du bien-etre chez la truie gestante bloquee: relation entre le bien-etre et la productivite numerique. (Welfare assessment in the pregnant sow kept in stalls and relationship with productivity). *Journ. Rech. Porcine Fr.* 23 pp.
- Den Hartog, L. A., G. B. C. Backus and H. M. Vermeer et al. 1993. Evaluation of housing systems for sows. *J. Anim. Sci.* 71:1339-1334.
- McGlone, J. J., J. L. Salak-Johnson, R. I. Nicholson and T. Hicks. 1994. Evaluation of crates and girth tethers for sows: Reproductive performance, immunity, behavior and ergonomic measures. *Appl. Anim. Behav. Sci.* 39:297-311.
- Signoret, J. P. and C. Vieuille. 1996. Effectiveness and limitations of physiological versus ethological criteria to assess the welfare of pigs in relation to the housing system. *Pig News Info.* 17:115N-121N.
- Vermeer, H. M., G. B. C. Backus, H. J. Blokhuis, J. H. M. Metz, G. van Putten, W. G. P. Schouten, J. J. J. Smeets and J. H. M. Verheijden. 1996. Welfare assessment in four housing systems for dry sows. In: *Proc. ISAE mtg.* Guelph, Ontario.
- Vieuille-Thomas, C., G. Lepate and J. P. Signoret. 1995. Stereotypes in pregnant sows: Indications of influence of the housing system on the patterns expressed by the animals. *Appl. Anim. Behav. Sci.* 44:19-27.

# Reasonable Alternatives

Welfare Index Score from Bracke, 2001 in brackets

- Family pens (8.8)
- Outdoor (7.5)
- ESF (6.2)
- Trickle feeders (5.4)
- Group pens with feeding stalls (5.4)
- Crates (stalls) (3.2)
- Tethers (2.5)

# Crates vs. Outdoor System

- Basically no difference in sow and litter productivity, indoors and outdoors

Johnson, Morrow & McGlone. 2001. Behavior and performance of lactating sow and piglets reared indoors or outdoors. *J. Anim. Sci.* 79:2588-259



# Crates vs. Indoor Pens

## Issues

- Control of feed intake
- Maintenance of body condition
- Social stress, particularly around feeding
- Sows should eat together (EU requirement)  
not one at a time
- Room for normal behaviors (social and postural changes)

# Trickle Feeding (Biofix)

- Invented in Sweden by Ove Olsson, prior to 1981
- Sows are fed in a slow manner; the feed delivery is timed to the rate of eating of the slowest-eating sow
- Sows quickly learn there is nothing to be gained by stealing neighbor's feed and feeding is quiet

**Texas Tech University,  
USDA-ARS,  
Automated Production Systems (AP, Inc)**

- To determine the effect of trickle and drop feeding for sows in crates and pens on gilt/sow reproductive performance, behavior, immunity, ergonomics and pre-harvest food safety
  - Crate, drop feeding
  - Crate, trickle feeding
  - Pen, drop feeding
  - Pen, trickle feeding

# Trickle feeding



an on-going study

<http://www.pii.ttu.edu>

***Pork Industry Institute***  
**Texas Tech University**



[Sow Housing -- a current issue](#) **New!!!**