



## **Scientists and Experts on Gestation Crates and Sow Welfare**

### **Abstract**

At present, the confinement of gestating sows in individual crates is common in the U.S. pork production, though significant recent movement by industry, retailers, and legislatures has begun phasing out the use of gestation crates due in part to the many welfare problems suffered by crated sows, including elevated risk of urinary tract infections, weakened bones, overgrown hooves, lameness, behavioral restriction, and stereotypies. An extensive body of scientific evidence confirms that gestation crates reduce animal well-being. Compiled below are statements by leading welfare scientists and experts.

### **Introduction**

In a letter to the editor published in the *Journal of the American Veterinary Medical Association*, Brenda K. Forsythe summed up the question of the use of gestation crates and its impact on the welfare, including health, of sows. She wrote:

The premise is that housing intelligent, sentient beings for months in a space too small to turn around in constitutes cruelty, and I would have to agree. Most veterinarians decry the warehousing of small animals in puppy mill operations, so tell me how is the extreme confinement of other sentient animals any more acceptable to the veterinary community?

There is an abundance of scientific literature demonstrating the adverse effects of gestation crate confinement on porcine well-being. Crated pigs develop a significant chronic stress response manifested by increased cortisol concentrations, compared with gilts housed in turnaround stalls. The well-being of stall-housed sows is compromised, compared with group-housed sows, on several indicators of welfare including behavioral stereotypes, aggression, and body weight.<sup>1</sup>

### **Bernard E. Rollin, University Distinguished Professor, Professor of Philosophy, Professor of Animal Sciences, and Professor of Biomedical Sciences, Colorado State University, Fort Collins, Colorado, USA**

- “Having visited, and extensively studied, examples of all contemporary systems utilized in confinement agriculture—be it poultry, veal, cattle, or swine—I can unhesitatingly affirm that sow stalls, or gestation crates, are the most egregious example of the application of industrial methods to animal production. While all of these systems are violative of animals’ physical and psychological nature—what I call telos, following Aristotle—when one vectors into one’s reckoning porcine intelligence, behavioral complexity under natural conditions, and severity of truncation of natural behaviors in these stalls, including even simple postural adjustment, gestation crates come to the forefront as the worst of a bad lot. I have personally witnessed ordinary people’s response to their first experience of these crates, and have seen eminent academics emerge from a sow barn unabashedly in tears. I have also seen an open pen system for sows literally side by side with a stall system, and watched the extraordinary differences in the behavior of the sows. While those animals in the stalls exhibited fear, skittishness, a reluctance to approach humans, and what can only be called a mad facial expression, those in the open pens were friendly, inquisitive, and exploratory (even to the extent of one sow starting to eat my necktie while I was still wearing it).”<sup>2</sup>

## **Scientific Veterinary Committee of the European Commission**

- “When sows are put into a very small pen, they indicate by their behavioural responses that they find the confinement aversive. If given the opportunity, they leave the confined space and they usually resist attempts to make them return to that place.”<sup>3</sup>
- “Stereotypies [usually a repeated sequence of movements having no obvious purpose] such as bar-biting, sham-chewing, drinker-pressing, head-weaving, repeated patterns of nosing in a trough and tongue-rolling have been reported by many authors as occurring in many sows confined in stalls or tethers.”<sup>4</sup>
- “[S]tereotypies are a characteristic behaviour of sows confined in a small space, typically in stalls or tethers, with little complexity in their environment and little possibility for the sow to regulate her interactions with all aspects of her environment.”<sup>4</sup>
- “Farmers often comment that their stall-housed or tethered sows are lying for much of the day. Since the extent of the inactivity and unresponsiveness indicates abnormal behaviour, the sows may well be depressed in the clinical sense and poor welfare is indicated. Some sows show this abnormal behaviour as an alternative to stereotypies and there are brain correlates of both of these types of abnormal behaviour.”<sup>5</sup>
- “Another consequence of lack of exercise in stall-housed and tethered sows is that they use their cardiovascular system less. This is significant in the situation where many pigs which die during transport are diagnosed as having cardiovascular problems.”<sup>6</sup>
- “Recommendation: Since overall welfare appears to be better when sows are not confined throughout gestation, sows should preferably be kept in groups.”<sup>7</sup>
- Sows in groups “have more exercise, more control over their environment, more opportunity for normal social interactions and better potential for the provision of opportunities to root or manipulate materials....As a consequence, group-housed sows show less abnormality of bone and muscle development, much less abnormal behaviour, less likelihood of extreme physiological responses, less of the urinary tract infections associated with inactivity, and better cardiovascular fitness.”<sup>7</sup>

## **American Veterinary Medical Association Task Force on the Housing of Pregnant Sows**

- “Stereotypies are more often observed in stall-housed sows than in [group] pen-housed sows.”<sup>8</sup>
- “That stereotypies are an indication of welfare problems was a strong consensus among nearly all authors whose work was reviewed.”<sup>8</sup>
- “Sows housed in stalls cannot exercise...control over their environment. They can use only minimal behavior to thermoregulate, cannot avoid sows that are aggressive or approach those with whom grooming relationships might be established, cannot flee a fear-producing stimulus, and cannot easily choose a place to lie down that is separate from where they defecate....In general...lack of control over stressful components of the environment suggests a reduction in welfare.”<sup>8</sup>
- “Gestation stalls, particularly when used in conjunction with feed restriction, may adversely affect welfare by restricting behavior, including foraging, movement, and postural changes....Other factors contributing to poor welfare in stalls and small, unbedded pens include lack of exercise, lack of environmental complexity, lack of rooting/chewing materials, and an inability for the sow to exert control over her environment.”<sup>8</sup>

**David Fraser, Professor, Animal Welfare Program, Faculty of Land and Food Systems and W. Maurice Young Centre for Applied Ethics, University of British Columbia, Vancouver, BC, Canada**

- According to *The Washington Post*: “‘Animal producers will never convince the public that they care about their animals if they house them in stalls where they can’t turn around for months,’ said David Fraser of the University of British Columbia, an animal welfare expert and member of the Burger King animal well-being advisory committee established last fall.”<sup>9</sup>

**Temple Grandin, Associate Professor, Department of Animal Science, Colorado State University, Fort Collins, Colorado, USA**

- “Gestation crates for pigs are a real problem....Basically, you’re asking a sow to live in an airline seat...I think it’s something that needs to be phased out.”<sup>10</sup>
- According to *The Washington Post*: “In a statement yesterday, McDonald’s hailed the Smithfield decision [to phase out use of gestation crates, announced on January 25, 2007], saying it was in line with advice it got from panel member Temple Grandin in particular, a leading animal welfare expert and author.  
Female pigs selected for breeding in most large pig nurseries are artificially impregnated early in their lives and soon after placed in the crates for their four-month pregnancies. According to Grandin, productive sows will spend several years in the cages while giving birth to five to eight litters. But as the sows get larger over the years, some cannot fit in the cages and are either slaughtered or forced to live in conditions where they can sleep only on their chests, rather than their sides as they do normally.”<sup>11</sup>
- “I’ve been around the industry for 35 years, and you know, we’ve got a lot of young people in the industry now that don’t know anything different than sow stalls, but in the ‘70s all the sows were living in pens and they were just fine....And Smithfield switched over and things have been working fine.”<sup>12</sup>

**Michael C. Appleby, Member, Farm Animal Welfare Council, an independent advisory body established by the U.K. government**

- “Crates and tethers do offer challenges to sow welfare, as they considerably restrict movement, particularly foraging, which is an important component of behavior in these food-restricted animals. Frustration of foraging instincts often results in stereotypic behaviors, which are generally interpreted as indicators of reduced welfare. There are also welfare problems in group housing, such as aggression between sows, but these problems are mostly amenable to management, whereas the problems of crates and tethers are more integral to those systems.”<sup>13</sup>

**Edmond A. Pajor, Associate Professor, Animal Behavior and Welfare, Department of Animal Sciences, Purdue University, West Lafayette, Indiana, USA**

- “In gestation stalls, sows are prevented from performing many of the behavior patterns that pigs would perform in more natural or less restricted conditions resulting in a negative impact on sow welfare.”<sup>14</sup>
- “Housing sows in groups provides sows with:
  1. more room to move and exercise
  2. more control over their environment
  3. more opportunity for normal social interactions.”<sup>14</sup>

**John Webster, Senior Research Fellow and Emeritus Professor of Animal Husbandry, Department of Clinical Veterinary Science, University of Bristol, UK**

- “Confinement of sows during pregnancy, especially in individual stalls or on tethers, can be cold, uncomfortable and injurious, and imposes severe restrictions on natural behaviour.”<sup>15</sup>
- “The case that sow stalls are good for welfare is that they protect sows from injuries incurred through fighting...[r]est[ing] on the premise that it is acceptable to prevent an undesirable pattern of behaviour by restricting all forms of behaviour. It would be as valid to claim that prisons would be so much more manageable if all the inmates were kept permanently in solitary confinement.”<sup>15</sup>
- “Outdoor units with well-designed, well-maintained arks fully meet the essential physiological and behavioural needs of sows most of the time...Moreover, unlike the sow in the confinement stall, they [outdoor pigs] are able to meet the most vital of all behavioural needs, namely the need to take positive action designed to make them feel good (or better, at least).”<sup>16</sup>
- “Sows on concrete in confinement stalls suffer abuse according to all the Five Freedoms:
  - lack of oral satisfaction;
  - lack of thermal and physical comfort;
  - pain and lameness from injuries, muscle weakness and osteoporosis;
  - stress-related oral stereotypies;
  - almost complete denial of normal maintenance behaviour (e.g. grooming, limb stretching).Those nations that still permit the confinement stall have either not yet reviewed the evidence or chosen to discard those elements of welfare abuse that I list above. This is, of course, not a scientific decision but a political one. When there is sufficient pressure of public opinion to persuade them that it is unjust then they will change their minds, because that is what politicians do.”<sup>17</sup>

**Neville Gregory, Professor, The Royal Veterinary College, University of London, UK**

- “Pigs kept in isolation became withdrawn, lying against the wall, refusing to move except under duress, and they were less interested in their environment and feed, whereas pigs kept as pairs or group housed had normal behaviour.”<sup>18</sup>
- “The stress of isolation can precipitate heart disease...Post-mortem examination after slaughter at about 14 months of age showed that arteriosclerosis was most advanced in confined, socially isolated female pigs.”<sup>18</sup>

**Donald M. Broom, Professor of Animal Welfare, Department of Veterinary Medicine, University of Cambridge, Cambridge, UK**

**Michael T. Mendl, Professor of Animal Behaviour and Welfare, Farm Animal Science, Department of Clinical Veterinary Science, University of Bristol, UK**

**Adroaldo J. Zanella, Animal Behavior and Welfare Group, Michigan State University, East Lansing, Michigan, USA**

- “Using a wide range of welfare indicators, it was clear that stall-housed sows [those confined in gestation crates] had more problems than group-housed sows and that these problems were worse in the fourth than in the first pregnancy. By the fourth pregnancy, stall-housed sows spent proportionately 0.14 of time showing activities which were clearly stereotypies and much time on activities which were sometimes stereotyped, i.e. ‘drinking’ and rooting or chewing at pen fittings making a total of proportionally 0.50 of time. Comparable figures for group-housed sows were much lower (0.037 and 0.081 in total). Stall-housed sows were also more aggressive than group-housed by the fourth pregnancy and their body weights were lower.”<sup>19</sup>

**Stanley E. Curtis**, Department of Animal Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, USA

**R. J. Hurst**, Formerly with the Department of Animal Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, USA

**Harold W. Gonyou**, Research Scientist, Prairie Swine Centre, Saskatoon, Canada

**A. H. Jensen**, Emeritus faculty, Department of Animal Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, USA

**A. J. Muehling**, Emeritus faculty, Department of Agricultural Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois, USA

- “It was estimated that a sow in our sample weighing 250 kg [551 lbs] would require physically...a minimum crate space 220.3 cm [86.7 in] long, 86.4 cm [34.0 in] wide and 99.0 cm [39.0 in] high...to stand up and lie down without touching the crate. Crates in gestation and farrowing houses in the U.S. commonly give the sow a space  $\leq 200$  cm [78.7 in] long...,  $\leq 60$  cm [23.6 in] wide and  $\leq 100$  cm [39.4 in] high.”<sup>20</sup>

**Ian J. Lean**, Department of Agricultural Sciences, Imperial College London, Wye, UK

- “Until the late 1990s (but illegal from 1 January 1999) [U.K.] producers housed most sows after serving, either individually in stalls, or in tethers....[W]hile stalls and tethers are efficient in production terms for housing pregnant sows, they deprive the sow of freedom of movement and deny her normal exercise....[M]any sows in these systems consequently show abnormal behaviour such as bar chewing, and it is probably right that these systems should now be banned.”<sup>21</sup>

**John J. McGlone**, Professor and Director, Pork Industry Institute, Department of Animal Science and Food Technology, Joint Appointment in Department of Cell Biology and Anatomy, Texas Tech University and Health Sciences Center, Lubbock, Texas, USA

**B. Vines**, Cargill Pork, Inc., Russellville, Arkansas, USA

**Anthony C. Rudine**, Formerly with the Pork Industry Institute, Department of Animal and Food Sciences, Texas Tech University, Lubbock, Texas, USA

**Paul R. Dubois**, Manager of Veterinary Services, Cargill Pork, Russellville, Arkansas, USA

- “Fewer than 40% of the sows in a conventional gestation stall (58 × 213 cm [22.8 x 83.9 in]) are contained within the width of the conventional stall without protruding outside the bars or being compressed against the bars of the side walls.”<sup>22</sup>

**P. E. Arellano**, Department of Clinical and Population Sciences, University of Minnesota, St. Paul, Minnesota, USA

**Carlos Pijoan**, Formerly Professor, Veterinary Population Medicine, College of Veterinary Medicine, University of Minnesota, Minnesota, USA

**Larry D. Jacobson**, Professor and Extension Engineer, Bioproducts and Biosystems Engineering, University of Minnesota, Minnesota, USA

**Bo Algers**, Professor, Department of Animal Environment and Health, Swedish University of Agricultural Sciences, Skara, Sweden. Formerly with the Department of Animal Hygiene, University of Skara, Skara, Sweden

- “Observations in this trial confirm that facility design influences the behaviour and social patterns of gestating sows. Sows in crates demonstrated more stereotypies, whereas sows in pens had more peaceful interactions.”<sup>23</sup>

**John L. Barnett**, Senior Research Scientist, Animal Welfare Science Centre, Primary Industries Research Victoria (PIRVic), Department of Primary Industries, Werribee Centre, Werribee, Victoria, Australia

**Paul H. Hemsworth**, Professor and Director, Animal Welfare Science Centre, University of Melbourne, Melbourne, Victoria, Australia

**Greg M. Cronin**, Senior Research Scientist, Animal Welfare Centre, Victorian Institute of Animal Science, Department of Primary Industries, Werribee, Victoria, Australia

**E. A. Newman**, Animal Welfare Centre, Department of Primary Industries, Victorian Institute of Animal Science, Werribee, Victoria, Australia

**T. H. McCallum**, Victorian Institute of Animal Science, Agriculture Victoria, Attwood, Victoria, Australia

- “Pigs housed in stalls comprised of horizontal bars showed evidence of a chronic stress response of a magnitude sufficient to adversely affect welfare...Pigs housed in stalls comprised of vertical bars showed...the highest levels of aggression of all treatments [including group housing].”<sup>24</sup>

**R. Bergeron**, Department of Animal Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, USA

**Harold W. Gonyou**, Research Scientist, Prairie Swine Centre, Saskatoon, Canada

**Thomas E. Eurell**, Department of Veterinary Biosciences, College of Veterinary Medicine, University of Illinois at Urbana-Champaign, Urbana, Illinois, USA

- “[T]he use of gestation stalls has been a controversial issue since the Brambell report (1965) suggested that animals should be provided with enough freedom of movement to turn around. More recently, gestation stalls have been associated with some indicators of chronic stress such as elevated levels of cortisol compared with group housing and a high incidence of stereotypies.”<sup>25</sup>

**Laura A. Boyle**, Pig Production Department, Teagasc, Moorepark Research Centre, Fermoy, Co. Cork, Ireland

**Finola C. Leonard**, Faculty of Veterinary Medicine, National University of Ireland, University College Dublin, Dublin, Ireland

**P. Brendan Lynch**, Pig Production Department, Teagasc, Moorepark Research Centre, Fermoy, Co. Cork, Ireland

**Patrick O. Brophy**, Department of Animal Science and Production, University College Dublin, Belfield, Dublin, Ireland

- “It has been suggested that inactive standing develops in sows housed individually in response to the difficulties they experience lying down in gestation stalls...During an unsuccessful attempt to lie down, sows frequently proceeded from kneeling to rotating the front half of the body until the side of the head and forelimb were resting on the floor...During these transitions the forelimbs are subjected to injurious forces such as pressure and sliding motion...”<sup>26</sup>

**H. Gjein**, The Norwegian Pig Breeders Association, NORSVIN, Norway

**Rolf B. Larssen**, Section of Herd Health, Department of Production Animal Clinical Sciences, Norwegian School of Veterinary Science, Oslo, Norway

- “Confined systems for sows are associated with welfare problems. Sows that are tethered or stalled have a higher frequency of stereotypic behaviour...more lameness and leg weakness and prolonged farrowing than sows in group housing.

Loose housing of pregnant sows has been established to improve the well-being of sows and also because loose housing is less expensive than other housing systems. Sows in loose housing are able to act more naturally than in confined systems. They can move freely around, engage in social behaviour and determine their own lying place.”<sup>27</sup>

**Jeremy N. Marchant-Forde**, Research Animal Scientist, Livestock Behavior Research Unit, USDA  
Agricultural Research Service, West Lafayette, Indiana, USA

**Donald M. Broom**, Professor of Animal Welfare, Department of Veterinary Medicine, University of Cambridge,  
Cambridge, UK

- “Both bones from stall-housed sows had breaking strengths that were about two-thirds those of group-housed sows. The results indicate that confinement of sows, with a consequent lack of exercise, results in reduction of muscle weight and considerable reduction of bone strength.”<sup>28</sup>
- “This decrease in bone strength may also influence the incidence of lameness, in conjunction with the differences in muscular conformation.”<sup>28</sup>
- “The results indicate that sows housed long-term in gestation stalls experience difficulty of movement when standing up quickly and lying down.”<sup>29</sup>
- “Persistent difficulty in carrying out the movements necessary for standing and lying indicates that the welfare of the sow is poorer than if there were no such difficulties.”<sup>29</sup>
- “[T]he vast majority of gestation stalls and farrowing crates are too small in width and length, to allow standing and lying to be carried out without spatial restriction. The problems of spatial restriction will become worse as the mature sow size continues to increase. Mature sizes of 300+ kg are becoming more common rendering more and more existing stall systems inadequate and having consequences for future building design. Restriction during movement may impose severe biomechanical stress on the sow, which may be a factor causing the higher incidence of lameness seen in sows housed in confinement.”<sup>29</sup>

**Karin H. Jensen**, Department of Animal Health and Welfare, Foulum, Danish Institute of Agricultural  
Sciences, Tjele, Denmark

**Bjarne K. Pedersen**, R&D Manager, Egebjerg International, Denmark. Formerly with the National Committee  
for Pig Breeding, Health and Production, Copenhagen, Denmark

**Lene J. Pedersen**, Danish Institute of Agricultural Sciences, Department of Animal Health, Welfare and  
Nutrition, Tjele, Denmark

**Erik Jørgensen**, Senior Scientist, Research Unit of Statistics and Decision Analysis, Research Centre Foulum,  
Faculty of Agricultural Sciences, Aarhus University, Denmark

- “The present study showed that, compared with confinement in crates, and in spite of an inadequate feeding method, group housing with electronic sow feeding improved the well-being of young sows after acclimatization to the gestation system.”<sup>30</sup>
- “[A]fter acclimatization young group-housed sows experienced less stress than young confined sows as manifested by a lower fear reaction to a novel stimulus and...lower reactivity in plasma cortisol to the acute stress.”<sup>30</sup>
- “The behavioural observations...and the results on integument lesions...revealed that the types of long-lasting stressor differed between gestation systems. In C [confined] sows, the suboptimal environment resulted in the well-known behavioural and integument aberrations that suggest subjection to long-term pressure against hard surfaces...and repeated frustration of motivations such as feeding, exploration or comfort behaviour....”<sup>30</sup>
- “[T]he assessment of stress showed higher levels of stress in young C [confined] sows than in young GH [group housed] sows...as indicated by decreased aggression and lack of further behavioural changes.”<sup>30</sup>

- “[I]n terms of sow well-being, group housing with electronic sow feeding in the gestation period was superior to confinement during most of the gestation period in the present study.”<sup>30</sup>
- “[A]n increasing number of studies indicate that confinement of sows for extended periods of time may reduce their well-being compared with housing in small groups, as indicated by changes in sow behaviour, physiological signs of stress, as well as reduced health and production....”<sup>30</sup>

**Sean Weaver**, Senior Lecturer, Academic Staff, School of Geography, Environment, and Earth Sciences, University, Wellington, New Zealand

**Michael C. Morris**, Formerly with Environmental Studies, School of Earth Sciences, Victoria University, Wellington, New Zealand

- “Sows housed in stalls are kept in such extreme confinement that they are unable to turn around. In some sectors of the pork industry, sows are subjected to this degree of confinement for almost their entire lives (apart from the brief periods associated with mating)...Because there is science on both sides of this policy divide, the argument to defend the use of sow stalls, therefore, is not one of science vs public opinion, but one of ethics....As an ethical debate, the issue of the use of the sow stall can then focus on the degree of suffering we as a society are willing to tolerate in agricultural practices, and the animal welfare costs associated with extreme economies of scale in sow stocking rates, rather than get bogged down in red herring debates over whether there is any suffering at all.”<sup>31</sup>

**W. Ray Stricklin**, Associate Professor, Department of Animal and Avian Sciences, University of Maryland, College Park, Maryland, USA

- “The pork industry still has a chance to take a pro-active stance on ethical issues and act before changes are forced upon them, and I believe there are many good reasons for doing so. First of all, I would argue that it is the right thing to do for the animals. Next, taking a pro-active stance gives the industry the opportunity to determine the time frame for change.”<sup>32</sup>

### **Pew Commission on Industrial Farm Animal Production**

- After reviewing the literature, visiting production facilities, and listening to producers themselves, the Commission believes that the most intensive confinement systems, such as...hog gestation pens...prevent the animal from a normal range of movement and constitute inhumane treatment.<sup>33</sup>
- Practices that restrict natural motion, such as sow gestation crates, induce high levels of stress in the animals and threaten their health, which in turn may threaten human health.<sup>34</sup>
- The Commission recommends the phase-out, within ten years, of all intensive confinement systems that restrict natural movement and normal behaviors, including swine gestation crates.<sup>34</sup>

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