

Poglavje 8

Zaključki

1. Prenaseljenost kotcev ima negativne učinke na fiziologijo, obnašanje in prirejo. Potreben prostor za prašiča je tista površina, na kateri leži nemoteno v stranski legi, zato je skupini prašičev potrebno zagotoviti najmanj toliko prostora, da vsi hkrati ležijo v stranski legi. Skupni prostor, namenjen različnim aktivnostim, si prašiči delijo, vendar mora biti prostora dovolj, da niso prašiči ves čas v tesnem kontaktu. Potrebna površina je odvisna od velikosti živali, velikosti skupine, klime in tipa hleva.
2. Pri prašičih je potrebno zagotoviti dovolj krmilnega prostora na žival, kar je povezano z načinom krmljenja. Pri restriktivnem krmljenju morajo vsi prašiči v skupini imeti hkraten dostop do krmilnega mesta. Pri krmljenju po volji lahko na krmilno mesto predvidimo tri živali na krmilno mesto, a zalogovnik mora biti ves čas poln.
3. Prašiči niso pripravljene storiti prav veliko, da bi bili na svetlem. Radi pa jedo na svetlem. Nekatere značilne oblike obnašanja, kot npr. raziskovanje, je vzrok, da je mora biti osvetlitev daljša, kot je čas samega krmljenja.
4. Prašiči nikakor ne smejo biti uhlevljeni v prostoru s stalno temo. Ni dopustno, da zagotovimo svetlobo samo za kratek čas, ko jih krmimo ali pregledujemo. Termini osvetljenosti in teme morajo dati prašičem dovolj priložnosti za izražanje normalnih vzorcev obnašanja in značilen dnevni ritem. Temo zagotovimo ponoči - v času, ko običajno počivajo. Primerno je vsak dan zagotoviti svetlobo vsaj 8 ur ali več. Intenzivnost svetlobe naj omogoča, da vidijo dovolj natančno tudi manjše predmete in nežne vizualne signale. Poleg tega naj rejcu omogoča pregled. Tako je zadostna osvetlitev 40-80 lux.
5. Termonevtralno območje je odvisno od starosti in velikosti prašičev, oskrbe s krmo, načina uhlevitve, drugih pogojev v hlevu (vlažnost, gibanje zraka) in okolju. Počutje prašičev je boljše, če imajo dostop do okolja, kjer je temperatura znotraj termonevtralne območja.
6. Prašičem moramo zagotoviti temperaturno udobje. Tudi pri rejah v naravi je potrebno vzpostaviti naravna zavetja in senco, ali pa zgradili zatočišča pred vremenskimi neprikljki in soncem. V vročih dneh naj bi imeli prašiči, rejeni zunaj, možnost kalužanja. Ob tem je potrebno poskrbeti za preventivo, da ne pride do širjenja bolezni.
7. Prašno okolje in visoke koncentracije amoniaka in drugih dražečih plinov povzročajo težave na dihalih. Tudi suh zrak je lahko dražeč faktor, saj spodbuja osuševanje sluznic dihal in izhlapevanje s kože in nižanje temperature kože, kadar je le-ta mokra.
8. Priporočene zgornje meje za vsebnost škodljivih plinov so 10 ppm za amoniak, 3000 ppm za ogljikov dioksid, 10 ppm za ogljikov monoksid in 0.5 ppm za žveplovdik.

9. Prašičem naj bi zagotavljali razmeroma visoko relativno vlažnost zraka (40 - 70 %). V hlevu naj ne bi bilo veliko prašnih delcev.
10. Močan hrup je lahko povzročen z mehničnimi napravami ali živalmi samimi. Stalni hrup v hlevu za prašiče mora biti majhen in konstantnega hrupa nad 85 dBA se moramo izogibati. Moteči je tudi nenadni močnejši hrup, prašiči se prestrašijo, bežijo in se ob tem tudi poškodujejo. Prevelik hrup je vzrok slabega počutja.

9 Viri

- 2008/120/ES 2009. Direktiva Sveta 2008/120/ES z dne 18. decembra 2008 o določitvi minimalnih pogojev za zaščito prašičev (kodificirana različica). Uradni List EU L47, 18.2.2009, 5–13
[http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:047:0005:0013:SL:PDF\(2011-09-25\)](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:047:0005:0013:SL:PDF(2011-09-25)).
- Aarnink A.J.A., Schrama J.W., Heetkamp M.J.W., Stefanowska J., Huynh T.T.T. 2005. Temperature and body weight affect fouling of pig pens. *J. Anim. Sci.* 84,8: 2224–2231.
- Algers B., Jensen P. 1991. Teat stimulation and milk production during early lactation in sows: effects of continuous noise. *Can. J. Anim. Sci.*, 71: 51–60.
- Arey D.S., Edwards S.A. 1998. Factors influencing aggression between sows after mixing and the consequences for welfare and production. *Livest. Prod. Sci.*, 56: 61–70.
- Baekbo P. 1990. Air quality in Danish pig herds. V: *Proceedings of the International Pig Veterinary Society*, str. 395.
- Baker J.E. 2004. Effective environmental temperature. *J. Swine Health Prod.* 12,3: 140–143.
- Baldwin B.A. 1974. Behavioural thermoregulation. *Heat Loss from Animals and Man*. Butterworths, London, U.K, 97–117.
- Baldwin B.A., Ingram D.L. 1967a. Behavioural thermoregulation in pigs. *Physiol. Behav.*, 2: 15–21.
- Baldwin B.A., Ingram D.L. 1967b. The effect of heating and cooling the hypothalamus on behavioural thermoregulation of the pig. *J. Physiol.*, 191: 375–392.
- Baldwin B.A., Ingram D.L. 1968a. The effects of food intake and acclimatization to temperature on behavioural thermoregulation in pigs and mice. *Physiol. Behav.*, 3: 395–400.
- Baldwin B.A., Ingram D.L. 1968b. Factors influencing behavioural thermoregulation in pigs. *Physiol. Behav.*, 3: 409–415.

-
- Baldwin B.A., Lipton J.M. 1973. Central and peripheral temperatures and EEG changes during behavioural thermoregulation in pigs. *Acta Neurobiol. Exp.*, 33: 433–447.
- Baldwin B.A., Meese G.B. 1977. Sensory reinforcement and illumination preference in the domesticated pig. *Anim. Behav.*, 25: 497–507.
- Baldwin B.A., Start I.B. 1985. Illumination preferences of pigs. *Appl. Anim. Behav. Sci.*, 14: 233–243.
- Barnett J.L., Cronin G.M., Hemsworth C.H., Winfield C.G. 1984. The welfare of confined sows: physiological, behavioural and production responses to contrasting housing systems and handler attitudes. *Annales Rech. Vétérinaire*, 15: 217–226.
- Barnett J.L., Cronin G.M., McCallum T.H., Newman E.A. 1994. Effects of food and time of day on aggression when grouping unfamiliar adult pigs. *Appl. Anim. Behav. Sci.*, 39: 339–347.
- Bate L.A., Hacker R.R. 1985. Effect of cannulation and environmental temperature on the concentration of serum cortisol in pregnant sows. *Can. J. Anim. Sci.*, 65: 399–404.
- Baxter M.R., Schwaller C.E. 1983. Space requirements for sows in confinement. *Farm Animal Housing and Welfare*. The Hague, The Netherlands, 181–195.
- Baxter S.H. 1984. *Intensive Pig Production*. Granada Publishing Ltd, London, U.K., 588 str.
- Beattie V.E., O'Connell N.E., Moss B.W. 2000. Influence of environmental enrichment on the behaviour, performance and meat quality of domestic pigs. *Livest. Prod. Sci.*, 65: 71–79.
- Beattie V.E., Walker N., Sneddon I.A. 1996. An investigation of the effect of environmental enrichment and space allowance on the behaviour and production of growing pigs. *Appl. Anim. Behav. Sci.*, 48: 151–158.
- Belie N.D. 1997. On-farm trial to determine the durability of different concrete slats for fattening pigs. *J. Agr. Eng. Res.*, 68: 311–316.
- Blackshaw J., Swainb A., Blackshawa A., Thomasa F., Gillies K. 1997. The development of playful behaviour in piglets from birth to weaning in three farrowing environments. *Appl. Anim. Behav. Sci.*, 55: 37–49.
- Blackshaw J.K. 1981. Environmental effects on lying behaviour and use of trough space in weaned pigs. *Appl. Anim. Ethol.*, 7: 281–286.
- Bogner H. 1982. Ethological demands in the keeping of pigs. *Appl. Anim. Ethol.*, 8: 301–305.
- Box H.O. 1973. *Organization in animal communities: Experimental and Naturalistic Studies of the Social Behaviour of Animals*. Butterworth, London, U.K., 265 str.

- Brambell F.W.R. 1965. Report of the technical committee to enquire into the welfare of animals kept under intensive livestock husbandry systems. HMSO, London, U.K., 84 str.
- Bray C.I., Singletary C.B. 1948. Effect of hog wallows on gains of fattening swine. *J. Anim. Sci.*, 7: 521–522.
- Brent G. 1986. *Housing the Pig*. Farming Press Limited, Suffolk, 256 str.
- Bronson F.H., Eleftheriou B.E. 1963. Adrenal responses to crowding in *peromyscus* and C57BL/10J mice. *Physiol. Zool.*, 36: 161–166.
- Broom D.M. 1981. *Biology of behaviour*. Cambridge Univ. Press, Cambridge, U.K., 320 str.
- Brouns F., Edwards S.A. 1994. Social rank and feeding behaviour of group-housed sows fed competitively or ad libitum. *Appl. Anim. Behav. Sci.*, 39: 225–235.
- Bruce J.M. 1990. Straw-Flow: a high welfare system for pigs. *Farm Build. Progr.*, 102: 9–13.
- Bruce J.M., Clark J.J. 1979. Models of heat production and critical temperature for growing pigs. *Anim. Prod.*, 28: 353–369.
- Brumm M.C., Miller P.S. 1996. Response of pigs to space allocation and diets varying in nutrient density. *J. Anim. Sci.*, 74: 2730–2737.
- Brumm M.C., NCR-89 Committee on Management of Swine 1996. Effect of space allowance on barrow performance to 136 kilograms body weight. *J. Anim. Sci.*, 74: 745–749.
- Bryant M.J. 1970. The influence of population density and grouping upon the behaviour of the growing pig. Phd thesis. University of Liverpool, U.K.
- Bryant M.J., Ewbank R. 1974. Effects of stocking rate upon the performance, general activity and ingestive behaviour of groups of growing pigs. *Brit. Vet. J.*, 130: 139–149.
- Béline F., Martinez J., Chadwick D., Guizieu F., Coste C.M. 1999. Factors affecting nitrogen transformations and related nitrous oxide emissions from aerobically treated piggery slurry. *J. Agr. Eng. Res.*, 73: 235–243.
- Büscher W., Franke G., Haidn B., Müller H., Niethammer F., Leucsher P. 2004. *Lüftung von Schweineställen*. DLG-Arbeitsunterlage, 59 str.
- Canh T.T., Verstegen M.W., Aarnink A.J., Schrama J.W. 1997. Influence of dietary factors on nitrogen partitioning and composition of urine and feces of fattening pigs. *J. Anim. Sci.*, 75: 700–706.
- Carpenter G.A., Cooper A.W., Wheeler G.E. 1986. The effect of air filtration on air hygiene and pig performance in early-weaner accomodation. *Anim. Prod.*, 43: 505–515.

- Chaloupková H., Illmann G., Bartoš L., Špinka M. 2006. The effect of pre-weaning housing on the play and agonistic behaviour of domestic pigs. *Appl. Anim. Behav. Sci.* article in press.
- Christian J.J. 1955. Effects of population size on the adrenal glands and reproductive organs of male mice in populations of fixed size. *Am. J. Physiol.*, 182: 292–300.
- Christian J.J. 1963. Endocrine adaptive mechanisms and the physiologic regulation of population growth. V: *Physiological mammalogy*. Mayer M., van Gelder G. (ur.), Academic Press, New York, USA, 189–253.
- Close W.H. 1981. The climatic requirements of the pig. V: *Environmental Aspects of Housing for Animal Production*. Clark J.A. (ur.), Butterworths, London, 149–166.
- Close W.H., Heavens R., Brown D. 1981. The effects of ambient temperature and air movement on heat loss from the pig. *Anim. Prod.*, 32: 75–84.
- Coffey R.D., Parker G.R., Laurent K.M. 1995. Feeding growing-finishing pigs to maximize lean growth rate. University of Kentucky Extension publication ASC=147.
- Craig J.V. 1981. *Domestic Animal Behaviour. Causes and implications for animal care and management*. Prentice Hall Inc., Englewood Cliffs, New Jersey, USA, 364 str.
- Cronin G.M., Hensworth P.H., Winfield C.G., Muller B., Chamley W.A. 1983. The incidence of, and factors associated with, failure to mate by 245 days of age in the gilt. *Anim. Rep. Sci.*, 5: 199–205.
- Csermely D., Wood-Gush D.G.M. 1981. Artificial stimulation of ingestive behaviour in early-weaned piglets. *Biol. Behav.*, 6: 159–165.
- Csermely D., Wood-Gush D.G.M. 1990. Agonistic behaviour in grouped sows. II. How social rank affects feeding and drinking behaviour. *Boll. Zool.*, 57: 55–58.
- Curtis S.E. 1972. Air environment and animal performance. *J. Anim. Sci.*, 35: 628–638.
- de Haer L.C.M. 1992. Relevance of eating pattern for selection of growing pigs. *Dokt. disertacija*, Research institute for Animal Production (IVO-DLO), 159 str., Wageningen Agricultural University, The Netherlands.
- de Jong I.C., Ekkel E.D., van de Burgwal J.A., Lambooi E., Korte S.M., Ruis M.A., Koolhaas J.M., Blokhuis H.J. 1998. Effects of strawbedding on physiological responses to stressors and behavior in growing pigs. *Physiol. Behav.*, 64: 303–310.
- Den Hartog L.A., Vermeer H.M., Swinkels J.W.G.M., Verdoes N., Backus G.B.C. 1996. Applied research on new pig housing systems. *Pig News Info.*, 17: 123–127.
- Donham K.J., Haglund P., Peterson Y., Rylander R., Belin L. 1989. Environmental and health studies on farm workers in swedish swine confinement buildings. *Brit. J. Ind. Med.*, 46: 31–37.

- Edwards S.A., Armsby A.W., Spechter H.H. 1988. Effects of floor area allowance on performance of growing pigs kept on fully slatted floors. *Anim. Prod.*, 46: 453–459.
- Esbenshade K.L., Paterson A.M., Day B.N. 1983. Glucocorticoids and estrus in swine. 1. The relationship between triamcinolone acetonide and estrogen in the expression of estrus in gilts. *J. Anim. Sci.*, 56: 460–465.
- Ewbank R., Bryant M.J. 1969. The effects of population density upon the behaviour and economic performance of fattening pigs. *Farm Build. Progr.*, 18: 14–15.
- Ewbank R., Bryant M.J. 1972. Aggressive behaviour amongst groups of domesticated pigs kept at various stocking rates. *Anim. Behav.*, 20: 21–28.
- Fagen R.M. 1981. *Animal Housing and Welfare*. New York: Oxford University Press, str. 684.
- Feddes J.J.R., Young B.A., DeShazer J.A. 1989. Influence of temperature and light on feeding behaviour in pigs. *Appl. Anim. Behav. Sci.*, 23: 215–222.
- Fraser A.F., Broom D.M. 1990. *Farm Animal Behaviour and Welfare*. 3rd Edition Wallingford: C.A.B. International, 448 str.
- Fraser D., Rushen J. 1987. Aggressive behaviour. *Veterinary Clinics of North America: Food Animal Practice*, 3: 285–305.
- Fritschen R. 1975. Toilet Training Pigs on Partly Slotted Floors. Cooperative Extension Service Institute of Agriculture and Natural Resources, University of Nebraska.
- Geers R., Dellaert B., Goedseels V., Hoogerbrugge A., Vranken E., Maes F., Berkman D. 1989. An assessment of optimal air temperatures in pig houses by the quantification of behavioural and health-related problems. *Anim. Prod.*, 48: 571–578.
- Gehlbach G.D., Becker D.E., Cox J.L., Harman D.G., Jensen A.H. 1966. Effects of floor space allowance and number per group on performance of growing-finishing swine. *J. Anim. Sci.*, 25: 386–391.
- Gonyou H.W. 1987. Auditory and social stimulation of newly weaned pigs. *Appl. Anim. Behav. Sci.*, 17: 366.
- Gordon W.A.M. 1963a. Environmental studies in pig housing. IV. The bacterial content of air in piggeries and its influence on disease incidence. *Brit. Vet. J.*, 119: 263–271.
- Gordon W.A.M. 1963b. Environmental studies in pig housing. V. The effects of housing on the degree and incidence of pneumonia in bacon pigs. *Brit. Vet. J.*, 119: 307–315.
- Gustafsson G., Jeppsson K.H., Hultgren J., Sanno J.O. 2005. Techniques to reduce the ammonia emission from a cowshed with tied dairy cattle. *Agricultural Engineering International*, VII: 1–13.

- Hafez E.S.E., Signoret J.P. 1969. The behaviour of swine. V: The Behaviour of Domestic Animals. Hafez E.S.E. (ur.), Baillere Tindall and Cassell, London, U.K, 149–166.
- Hamilton T.D.C., Roe J.M., Taylor F.G.R., Pearson G., Webster A.J.F. 1993. Aerial pollution: an exacerbating factor in atrophic rhinitis in pigs. V: Proceedings of Livestock and Environment IV, Coventry, 895–903.
- Hanrahan T.J. 1984. Advances in feeding and management of pigs. V: Pig Husbandry Seminar. Proceedings of Moorepark Pig Farming Conference, 38–51.
- Hartung J. 1994. Environmental aspects of housing for animal production. V: Pollution in Livestock Production Systems. Dewi I., Axford R.F.E., Marai I.F.M., Omed H.M. (ur.), CAB International, Wallingford, U.K., 55–70.
- Hartung J., Phillips V.R. 1994. Control of gaseous emissions from livestock buildings and manure stores. *J. Agr. Eng. Res.*, 57: 173–189.
- Heath M.E. 1980. Effect of rearing-temperature on the thermoregulatory behaviour of pigs. *Behav. Neural Biol.*, 28: 193–202.
- Hediger H. 1941. Biologische Gesetzmässigkeiten im Verhalten von Wirbeltieren. Mitteilungen der Vogtländischen Gesellschaft für Naturforschung, 37–55. <http://retro.seals.ch/digbib/view?pid=mnb-001:1940:-:94>.
- Hediger H. 1954. Skizzen zu einer Tierpsychologie im Zoo und im Zirkus. Gutenberg, Zuerich, Switzerland.
- Heitman H., Hahn L., Kelley C.F., Bond T.E. 1961. Space allotment and performance of growing-finishing swine raised in confinement. *J. Anim. Sci.*, 20: 543–546.
- Hemsworth P.H., Barnett J.L., Hansen C., Winfield C.G. 1986. Effects of social environment on welfare status and sexual behaviour of female pigs. I. effects of group size. *Appl. Anim. Behav. Sci.*, 16: 249–257.
- Hemsworth P.H., Brand A., Willems P. 1981. The behavioural response of sows to the presence of human beings and their productivity. *Livest. Prod. Sci.*, 8: 67–74.
- Henschler D. 1990. Maximale Arbeitsplatzkonzentrationen und biologische Arbeitsstoffto-leranzwerte. V: Mitteilung der senatskommission zur Prüfung Gesundheitsschädlicher Arbeitsstoffe; 26. VCH Verlagsgesellschaft, Weinheim, Germany.
- Huynh T., Aarnink A., Gerrits W., Heetkamp M., Canh T., Spoolder H., Kemp B., Verstegen M. 2005a. Thermal behaviour of growing pigs in response to high temperature and humidity. *Appl. Anim. Behav. Sci.*, 91.
- Huynh T.T.T., Aarnink A.J.A., Verstegen M.W.A., Gerrits W.J.J., Heetkamp M.J.W., Kemp B., Canh T.T. 2005b. Effects of increasing temperatures on physiological changes in pigs at different relative humidities. *J. Anim. Sci.*, 83: 1385–1396.

- Ingram D.L. 1965. Evaporative cooling in the pig. *Nature*, 207: 415–416.
- Ingram D.L. 1974. Heat loss and its control in pigs. V: *Heat Loss from Animals and Man*; J. L. Monteith and L. E. Mount, 233–254.
- Ingram D.L., Legge K.F. 1970. The thermoregulatory behaviour of young pigs in a natural environment. *Physiol. Behav.*, 5: 981–990.
- Jensen A.H., Becker D.E., Harmon B.G. 1966. Management factors and young pig performances. *J. Anim. Sci.*, 25: 1273.
- Jensen A.H., Curtis S.E. 1976. Effects of group size and of negative air ionization on performance of growing-finishing swine. *J. Anim. Sci.*, 42: 8–11.
- Jensen P. 1984. Effects of confinement on social interaction patterns in dry sows. *Appl. Anim. Behav. Sci.*, 12: 93–101.
- Jensen P. 1994. Fighting between unacquainted pigs - effects of age and of individual reaction pattern. *Appl. Anim. Behav. Sci.*, 41: 37–52.
- Jensen P., Wood-Gush D.G.M. 1984. Social interactions in a group of free-ranging sows. *Appl. Anim. Behav. Sci.*, 12: 327–337.
- Jones J.B., Burgess L.R., Webster A.J.F., Wathes C.M. 1996. Behavioural responses of pigs to atmospheric ammonia in a chronic choice test. *Anim. Sci.*, 63: 437–445.
- Jonge F.H.D., Bokkers E., Schouten W., Helmond F. 1996. Rearing piglets in a poor environment: Developmental aspects of social stress in pigs. *Physiol. Behav.*, 60: 389–396.
- Kay R.M., Lee P.A. 1997. Ammonia emission from pig buildings and characteristics of slurry produced by pigs offered low crude protein diets. V: *Proceedings of the International symposium on ammonia and odour control from animal production facilities*. Vinkeloord, The Netherlands, 253–260.
- Kay R.M., Smith A.T. 1992. The performance of three consecutive groups of pigs finished on in situ composting sawdust beds. *Anim. Prod.*, 54: 484.
- Kelly C.F., Bond T.E., Garrett W. 1964. Heat transfer from swine to a cold slab. *T. ASABE*, 7: 34–37.
- KestrelMeters.com 2015. Cattle heat stress (THI). <http://kestrelmeters.com/blogs/news/27481668-cattle-heat-stress-thi> (2015-10-13).
- Lammers G.J., Schouten W.G.P. 1985a. Effect of pen size during rearing on later agonistic behaviour in piglets. *Neth. J. Agr. Sci.*, 33: 307–309.
- Lammers G.J., Schouten W.G.P. 1985b. Effect of pen size on the development of agonistic behaviour in piglets. *Neth. J. Agr. Sci.*, 33: 305–307.

- Lawrence A., Appleby M. 1996. Welfare of extensively farmed animals: principles and practice. *Appl. Anim. Behav. Sci.*, 49: 1–8.
- Le Dividich J., Herpin P. 1994. Effects of climatic conditions on the performance, metabolism and health status of weaned piglets: a review. *Livest. Prod. Sci.*, 38: 79–90.
- Li Y.Z., Wang L.H., Johnston L.J. 2012. Effects of farrowing system on behavior and growth performance of growing-finishing pigs. *J. Anim. Sci.*, 90: 1008–1014. Published 2015.
- Madsen A., Nielsen E.K., Hansen L.L. 1976. Some Danish experiments on the influence of housing systems on the performance of growing pigs. US Feed Grains Council, Hamburg.
- Martin J.E., Edwards S.A. 1994. Feeding behaviour of outdoor sows - The effect of diet quantity and type. *Appl. Anim. Behav. Sci.*, 41: 63–74.
- Mayer M., Rosen F. 1977. Interaction of glucocorticoids and androgens with skeletal muscle. *Metabolism*, 26: 937–962.
- McBride G., James J.W., Hodgens N. 1964. Social behaviour of domestic animals. IV. growing pigs. *Anim. Prod.*, 6: 129–139.
- McGlone J.J., Curtis S.E. 1985. Behaviour and performance of weanling pigs in pens equipped with hide areas. *J. Anim. Sci.*, 60: 20–24.
- McGlone J.J., Newby B.E. 1994. Space requirements for finishing pigs in confinement: behaviour and performance while group size and space vary. *Appl. Anim. Behav. Sci.*, 39: 331–338.
- McInnes S.J., Blackshaw J.K. 1984. The effect of air movement on the activity, lying position and huddling behaviour of weaned piglets. *Aust. Vet. J.*, 61: 387–392.
- McKinnon A.J., Edwards S.A., Stephens D.B., Walters D.E. 1989. Behaviour of groups of weaner pigs in three different housing systems. *Brit. Vet. J.*, 145: 367–372.
- Meese G., Ewbank R. 1973. The establishment and nature of the dominance hierarchy in the domesticated pig. *Anim. Behav.*, 21: 326–334.
- Mormede P., Lemaire V., Castanon N., Dulluc J., Laval M., Moal M.L. 1990. Play behavior, persistence, decrease, and energetic compensation during food shortage in deer fawns. *Physiol. Behav.*, 47: 1099–1105.
- Morrison R.S., Hemsworth P., Cronin G.M., Campbell R.G. 2003. The social and feeding behaviour of growing pigs in deep-litter, large group housing systems. *Appl. Anim. Behav. Sci.*, 82: 173–188.
- Morrow A.T.S., Walker N. 1994. Effects of number and siting of single-space feeders on performance and feeding behaviour of growing pigs. *J. Agric. Sci.*, 122: 465–470.

- Moss B.W. 1978. Some observations on the activity and aggressive behaviour of pigs when penned prior to slaughter. *Appl. Anim. Ethol.*, 4: 323–339.
- Mount L.E. 1960. The influence of huddling and body size on the metabolic rate of the young pig. *J. Agric. Sci.*, 55: 101–105.
- Myers K., Hale C.S., Mykytowycz R., Hughes R.L. 1971. The effects of varying density and space on sociality and health in animals. *Behaviour and Environment: The Use of Space by Animals and Men*. Plenum Press, New York, USA, 148–187.
- Müller-Schwarze D., Stagge B., Müller-Schwarze C. 1982. Play behavior, persistence, decrease, and energetic compensation during food shortage in deer fawns. *Science*, 215: 85–87.
- Ndegwa P.M., Hristovb A.N., Arogoc J., Sheffield R.E. 2008. A review of ammonia emission mitigation techniques for concentrated animal feeding operations. *Biosyst. Eng.*, 100: 453–469.
- Newberry R.C., Wood-Gush D.G.M. 1988. Development of some behaviour patterns in piglets under semi-natural conditions. *Anim. Prod.*, 46: 103–109.
- Nielsen B.L., Lawrence A.B., Whittemore C.T. 1995. Effect of group size on feeding behaviour, social behaviour, and performance of growing pigs using single-space feeders. *Livest. Prod. Sci.*, 44: 73–85.
- Nimmermark S., Gustafsson G. 2005. Influence of temperature, humidity and ventilation rate on the release of odour and ammonia in a floor housing system for laying hens. *Agricultural Engineering International*, VII: 1–14.
- O'Connell N.E., Beattie V.E. 1999. Influence of environmental enrichment on aggressive behaviour and dominance relationships in growing pigs. *Animal Welfare*, 8: 269–279.
- Olsson I., de Jonge F., Schuurman T., Helmond F. 1999. Poor rearing conditions and social stress in pigs: repeated social challenge and the effect on behavioural and physiological responses to stressors. *Behavioural Processes*, 46: 201–215.
- Paterson A.M., Barker I., Lindsay D.R. 1978. Summer infertility in pigs: its incidence and characteristics in an Australian commercial piggery. *Australian Journal of Experimental Agriculture and Animal Husbandry*, 18: 698–701.
- Paterson A.M., Cantley T.C., Ebenshade K.L., Day B.N. 1983. Glucocorticoids and estrus in swine. ii. plasma concentrations of estradiol-17, glucocorticoids and luteinizing hormone in ovariectomized gilts given estradiol benzoate and triamcinolone acetonide. *J. Anim. Sci.*, 56: 466–470.
- Patterson D.C. 1985. A note on the effect of individual penning on the performance of fattening pigs. *Anim. Prod.*, 40: 185–188.

-
- Petherick J.C. 1983. A biological basis for the design of space in livestock housing. *Farm Animal Housing and Welfare*. The Hague, The Netherlands, 103–120.
- Petherick J.C. 2007. Spatial requirements of animal: Allometry and beyond. *J. Vet. Behav.*, 2: 197–204.
- Petherick J.C., Baxter S.H. 1981. Modelling the static spatial requirements of livestock. V: *Modelling, Design and Evaluation of Agricultural Buildings*. MacCormack J.A.D. (ur.), Scottish Farm Buildings Investigation Unit, Bucksburn, Aberdeen, U.K., 149–166.
- Petherick J.C., Beattie A.W., Bodero D.A.V. 1989. The effect of group size on the performance of growing pigs. *Anim. Prod.*, 49: 497–502.
- Petley M.P., Bayley H.S. 1988. Exercise and postexercise energy expenditure in growing pigs. *Can. J. Physiol. Pharm.*, 66: 721–730.
- Phillips P.A., Fraser D., Buckley D.J. 1992. Simulation tests on the effect of floor temperature on leg abrasion in piglets. *T. ASABE*, 35: 999–1003.
- Pickett R.A., Fugate W.H., Harrington R.B., Perry T.W., Curtin T.A. 1969. Influence of feed preparation and number of pigs per pen on performance and occurrence of esophagogastric ulcers in swine. *J. Anim. Sci.*, 28: 837–841.
- Piggins D. 1992. Visual perception. V: *Farm animal and the environment*. Phillips C., Piggins D. (ur.), CAB International, Wallingford, U.K., 131–158.
- Pointon A.M., Banhazi T. 1995. Evaluation of the pig health monitoring scheme as an industry service. *Hungarian Veterinary Journal*, 58: 750–756.
- Quiniou N., Dubois S., Noblet J. 2000. Voluntary feed intake and feeding behavior of group-housed growing pigs are affected by ambient temperature and body weight. *Livest. Prod. Sci.*, 63: 235–253.
- Quiniou N., Noblet J., Dourmad J.Y., van Milgen J. 1999. Influence of energy supply on growth characteristics in pigs and consequences for growth modelling. *Livest. Prod. Sci.*, 60: 317–328.
- Randolph J.H., Cromwell G.L., Stahly T.S., Kratzer D.D. 1981. Effect of group size and space allowance on performance and behavior of swine. *J. Anim. Sci.*, 53: 922–927.
- Riskowski G., Bundy D.S. 1990. Effect of air velocity and temperature on growth performance of weaning pigs. *T. ASABE*, 33: 1669–1675.
- Robertson J.F. 1994. Ammonia, dust and air quality: Quantifying the problem. *T. ASABE*, 33: 113–125.
- Ross M.C., Curtis S.E. 1976. Space allowance and pig behaviour. *J. Anim. Sci.*, 42: 1339.

- Ruckebusch Y. 1972. The relevance of drowsiness in the circadian cycle of farm animals. *Anim. Behav.*, 20: 637–643.
- Sainsbury D.W.B. 1963. Pig housing. Farming Press, Lloyds Chambers, Ipswich, U.K.
- Sainsbury D.W.B. 1967. Animal health and housing. Baillere Tindall and Cassell, London, U.K., 336 str.
- Scheepens C.J.M., Hessing M.J.C., Laarakken E., Schouten W.G.P., Tielen M.J.M. 1991. Influences of intermittent daily draught on the behaviour of weaned pigs. *Appl. Anim. Behav. Sci.*, 31: 69–82.
- Signoret J.P., Ramonet Y., Vieuille-Thomas C. 1995. L'élevage en plein air des truies gestantes. *J. Rech. Porcine en France*, 27: 11–18.
- Simonsen H.B. 1990. Behaviour and distribution of fattening pigs in the multi-activity pen. *Appl. Anim. Behav. Sci.*, 27: 311–324.
- Siviy S.M., Panksepp J. 1985. Energy balance and play in juvenile rats. *The Psychobiology of Attachment and Separation*, 435–441.
- Smith W.J., Penny R.H.C. 1981. Behavioural problems, including vices and cannibalism. *Diseases of swine (Fifth Edition)*. Iowa State Univ. Press, Ames, Iowa, USA, 671–680.
- Spensley J.C., Lines J.A., Hartung J., Waran N.K. 1994. The effect of noise on individual piglets. *Appl. Anim. Behav. Sci.*, 41: 278.
- Spicer H.M., Aherne F.X. 1987. The effects of group size/stocking density on weaning pig performance and behaviour. *Appl. Anim. Behav. Sci.*, 19: 89–98.
- Spinka M., Newberry R.C., Bekoff M. 2001. Mammalian play: training for the unexpected. *Q Rev Biol.*, 76: 141–168.
- Spoolder H.A.M., Corning S., Edwards S.A. 1997. A comparison of methods of specifying stocking density for welfare and performance of finishing pigs on different floor types. *Proc. Br. Soc. Anim. Sci.*, 43 str.
- Stephens D.B. 1971. The metabolic rates of newborn pigs in relation to floor insulation and ambient temperatures. *Anim. Prod.*, 13: 303–313.
- Stephens D.B., Start I.B. 1970. The effects of ambient temperature, nature and temperature of the floor and radiant heat on the metabolic rate of the newborn pig. *Int. J. Biometeorol.*, 14: 275–283.
- Strnad J. 1977. Vsakdanje izkušnje in specialna teorija relativnosti. *Anthropos*, str. 187.
- Swiergiel A.H., Ingram D.L. 1986. Effect of diet and temperature acclimation on thermoregulatory behaviour in piglets. *Physiol. Behav.*, 36: 637–642.

- Syme G.J., Syme, A. L. 1979. Social structure in farm animals. Elsevier, Amsterdam, The Netherlands, 200 str.
- Štuhec I., Kastelic A., Sever S., Vogrin-Bračič M., Pribožič P. 2005. Ureditev hlevov za rejo prašičev na slovenskih kmetijah. Spremljanje proizvodnosti prašičev, IV. del. Domžale, Univerza v Ljubljani, Biotehniška fakulteta, Katedra za etologijo, biometrijo in selekcijo ter prašičerejo, 55–73.
- Sällvik K., Walberg K. 1984. The effects of air velocity and temperature on the behaviour and growth of pigs. *J. Agr. Eng. Res.*, 30: 305–312.
- Talling J.C., Waran N.K., Whates C.M., Lines J.A. 1996. Behavioural and physiological responses of pigs to sound. *Appl. Anim. Behav. Sci.*, 48: 187–201.
- Tanida H., Miyazaki N., Tanaka T., Yoshimoto T. 1991. Selection of mating partners in boars and sows under multi-sire mating. *Appl. Anim. Behav. Sci.*, 32: 13–21.
- The Pig Site 2012. Controlling heat stress in swine. <http://www.thepigsite.com/articles/4038/controlling-heat-stress-in-swine/> (2015-10-13).
- Tober O. 1996. Circadian rhythms of selected behavioural activities of nonlactating sows maintained outdoors. *Tierarztl. Umschau*, 51: 111.
- Turner S.P., Edwards S.A. 2004. Housing immature domestic pigs in large social groups: implications for social organisation in a hierarchical society. *Appl. Anim. Behav. Sci.*, 87: 239–253.
- Turner S.P., Ewen M., Rooke J.A., Edwards S.A. 2000. The effect of space allowance on performance, aggression and immune competence of growing pigs housed on straw deep-litter at different group sizes. *Livest. Prod. Sci.*, 66: 47–55.
- ULRS 2003. Pravilnik o minimalnih pogojih za zaščito rejnih živali in postopku registracije hlevov za rejo kokoši nesnic. Ur.l. RS št. 41-2006/2003.
- ULRS 2010. Pravilnik o zaščiti rejnih živali. Ur.l. RS št. 51/2010, 28.06.2010: 7592–7600.
- Van Putten G. 1980. Objective observations on the behaviour of fattening pigs. *Anim. Regulat. Stud.*, 3: 105–108.
- Van Putten G., Elshof W.J. 1983. De invloed van licht op het welzijn van mestvarkens: een eerste indruk. *Bedrijfsontwikkeling*, 14: 139–142.
- Van Rooijen J. 1985. Possibilities and limitations of choice tests in relation to animal well-being. V: Proceedings of the International Congress on Applied Ethology in Farm Animals, 353–357.

- Verstegen M., van der Hel W. 1974. The effects of temperature and type of floor on metabolic rate and effective critical temperature in groups of growing pigs. *Anim. Prod.*, 18: 1–11.
- Štuhec I. 2005. Zoohigienski normativi reje prašičev. <http://agri.bf.uni-lj.si/Pedag/?q=node/67> (30-10-2014).
- Wathes C.M., Jones J.B., Kristensen H.H., Jones E.K.M., Webster A.J.F. 2002. Aversion of pigs and domestic fowl to atmospheric ammonia. *T. ASAE*, 45: 1605–1610.
- Webb J., Menzi H., Pain B., Misselbrook T., Dämmgen U., Hendriks H., Döhler H. 2005. Managing ammonia emissions from livestock production in Europe. *Environ. pollut.*, 135: 399–406.
- Wettemann R.P., Bazer F.W. 1985. Influence of environmental temperature on prolificacy of pigs. *J. Reprod. Fert.*, 33: 199–208.
- Whittemore C. 1993. *The science and practice of pig production*. Harlow, Longman Scientific and Technical: 661 str.
- Wiedmann R. 2009. *Pigport 123*. Books on Demand GmbH, Nordstedt, Germany: 176 str.
- Wiedmann R. 2011. *Gruppenhaltung tragender Sauen*. Books on Demand GmbH, Nordstedt, Germany: 216 str.
- Wiegand R.M., Gonyou H.W., Curtis S.E. 1994. Pen shape and size: effect on pig behaviour and performance. *Appl. Anim. Behav. Sci.*, 39: 49–61.
- Zin M. 1980. Effect of number of pigs in the group and of stocking density on the results of fattening. *Pig News and Information*, 1: 231–231.