Animal welfare concerning farming of pigs

Relevance of resource based indicators for pig welfare assessment

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EU Legislation

Council Directive 2008/120/EC of 18 December 2008 laying down minimum standards for the protection of pigs

Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes

National laws (S, D, NL, UK, DK, AU, B, BU)

Scientific references

The **welfare of intensively kept pigs**. Report of the Scientific Veterinary Committee Adopted 30 September 1997

Opinion of the AHAW on a request from the Commission related to welfare aspects of the **castration of piglets** update. 2004 Update 2005

Opinions of the Scientific Panel on Animal Health and Welfare (AHAW) on a request from the Commission related to welfare of weaners and rearing pigs: effects of different **space allowances and floor**. 2005

Opinion of the AHAW on a request from the Commission related to animal health and welfare in **fattening pigs in relation to housing and husbandry**. 2007

Opinion of AHAW on animal health and welfare aspects of different **housing and husbandry systems** for adult breeding boars, pregnant, farrowing sows and unweaned piglets. 2007

Opinion of AHAW on the risks associated with **tail biting** in pigs and possible means to reduce the need for tail docking considering the different **housing and husbandry systems**. 2007

Animal welfare risk assessment guidelines on **housing and management**. Technical report sumitted to EFSA. WUR 2010

EU Legislation

Table - List of EU minimum requirements of Directives 98/58/EC and 2008/120/EC according to WQ criteria.

Welfare Quality® PRINCIPLES	**Welfare Quality® CRITERIA**	**Distinguishing aspects of EU minimum requirements**
Good feeding	Absence of prolonged hunger	*Appropriate diet to satisfy nutritional needs*
		Feeding at least once a day
		Minimum age of 28 day at weaning (or 21 days)
		Sufficient quantity of fibre for dry sows and gilts
		Feeding system ensuring sufficient food to dry sows and gilts even when competitors are present
		Feeding equipment, designed, constructed and places so that contamination of food and the harmful effects are minimised
	Absence of prolonged thirst	**Permanent access to sufficient quantity of fresh water**
		Drinking equipment, designed, constructed and places so that contamination of food and the harmful effects are minimised

EU Legislation

Welfare Quality® PRINCIPLES	Welfare Quality® CRITERIA	Distinguishing aspects of EU minimum requirements
Good housing	Comfort around resting	Design of farrowing pens (nest flooring, space for suckling)
		Nesting material for farrowing gilts and sows
		Avoidance of continuous noise level as loud as 85 dBA
		No permanent darkness nor without appropriate period of rest
	Thermal comfort	Laying area physically and thermally comfortable, drained and clean (general requirement)
		Sufficient solid floored area for resting piglets in farrowing pens
		Air circulation, dust levels, T, RU and gas concentrations within limits not harmful for animals
		Back up and regularly tested alarm systems in case AVMs dependent on an artificial ventilation system
		Protection of animals not kept in buildings from adverse climate
	Ease of movement	Lightening 40 lux at least 8 hours/day
		Space allowance
		Minimum size of collective pens for sows and gilts (lenght 2,8 or 2,4 m)
		Pen design allowing pigs to escape and hide from other pigs in case in case of mixing unfamiliar groups of weaners and rearing pigs
		No tethers for sows and gilts and limitation of crates for pregnancy

EU Legislation

Welfare Quality® PRINCIPLES	Welfare Quality® CRITERIA	Distinguishing aspects of EU minimum requirements
Good health	Absence of injuries	**Limitation of slatted floor for pregnant sows and gilts**
		No sharp edges or protrusions likely to cause injuries to animals
		Size requirements for concrete slatted floor according to the pig size
		Protection of piglets in farrowing pens
		Availability of adequately sized individual pens to separate pigs at risk of aggression or injured or particularly aggressive
		Limitation of mixing groups of unfamiliar weaners and rearing pigs
		Pen design allowing pigs to escape and hide from other pigs in case in case of mixing unfamiliar groups of weaners and rearing pigs
	Absence of disease	Sufficient quantity of fibre for dry sows and gilts (to avoid stomach ulcers)
		Throughly cleaning of sows before housing them in farrowing crates
		Materials in contact with animals must be capable to be throughly cleaned and disinfected
		Availability of adequately sized individual pens for sick pigs
		Mnimum age at weaning (diarrhoea)
		Air circulation, dust levels, T, RU, and gas concentrations within limits not harmful for animals
		Protection of animals not kept in buildings from predators and risk for their health
		Record of medical treatments and number of mortalities
	Absence of pain induced by management procedures	No routinely reduction of corner teeth
		No routinely docking of a part of the tail
		Avoidance of tail docking
		No castration by other means that tearing the tissues
		Nose ringing in outdoors systems only

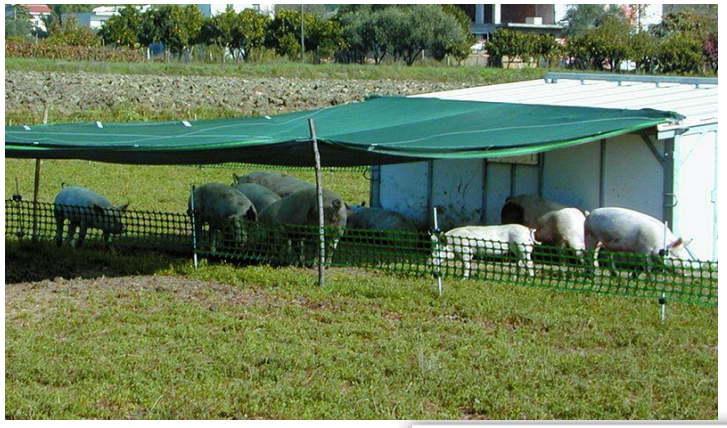
EU Legislation

Welfare Quality® PRINCIPLES	Welfare Quality® CRITERIA	Distinguishing aspects of EU minimum requirements
Appropriate behaviour	Expression of social behaviour	Sufficient quantity of fibre for dry sows and gilts (stomach ulcers)
		No stalls for sows and gilts and limitation of crates for pregnancy
	Expression of other behaviours	Visual contact with other pigs (except for farrowing stage)
		Access to a sufficient quantity of material to enable investigation and manipulation (general requirement)
		Nesting material for farrowing sows
	Good human-animal relationship	*Sufficient number of staff professionally skilled*
		Daily inspection of animals and of automatic or mechanical equipment essential for health and well being of the animals
		Mandatory instructions and guidance (training) for persons attending pigs
	Positive emotional state	No stalls for sows and gilts and limitation of crates for pregnancy
		Sufficient quantity of fibre for dry sows and gilts
		Pen design allowing pigs to escape and hide from other pigs in case of mixing unfamiliar groups of weaners and rearing pigs

AW assessment

Awareness and pragmatic approach is needed, based on scientific and technical-economic knowledges

Extreme anthropomorphic and anthropocentric views should be avoided because opposite and little constructive



AW assessment systems

Two groups of systems:

- based primarily on diagnostic parameters measured on the animal, such as physiological, medical, behavioral, production (animal-based systems)

- based primarily on technical parameters concerning the husbandry enviroment: housing system, building features, space allowance, type of flooring, microclimate control, hygiene level, equipment and management (farm index systems or resource-based systems)

AW & environment

air speed

light

umidity

toxic gases

dust

temperature

space

flooring

housing system

hygiene

group size

feeding and drinking

social relationship

Microclimate control

Air circulation, **temperature**, relative **umidity** and **gas** and **dust** concentrations, must be kept within levels not harmful for the animals

Microclimate control

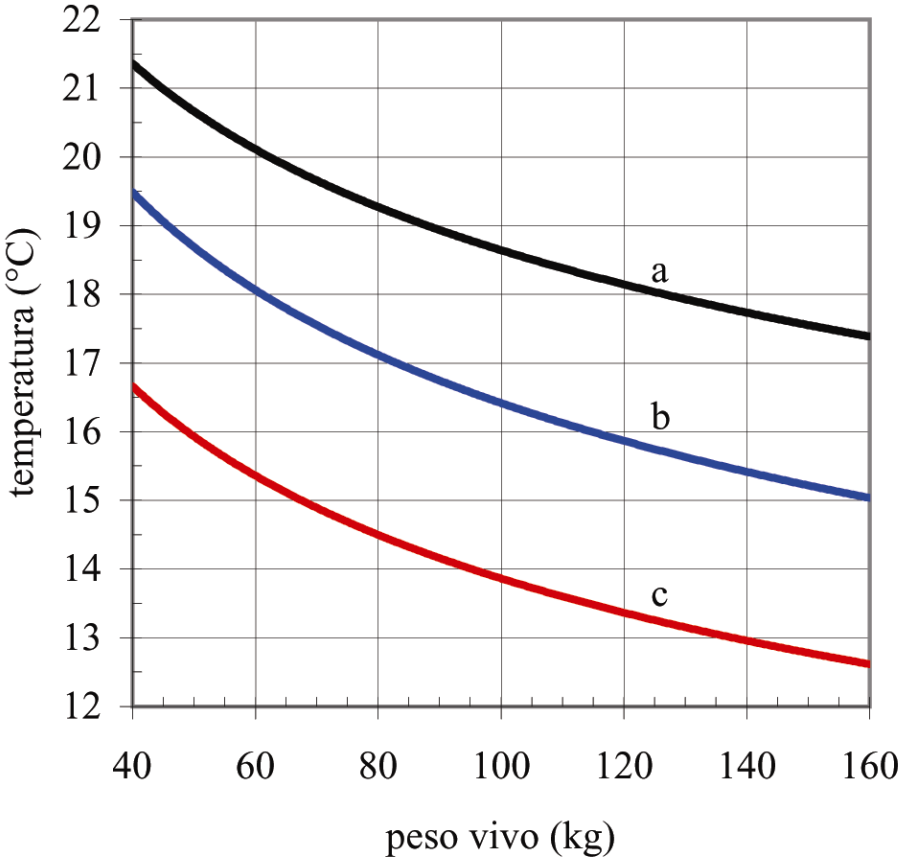
Temperature is the most important and widely investigated component of microclimate.
Correlations have been demonstrated between the **indoor air temperature** and feed consumption, daily growth, feed conversion, health status and reproductive activity.

Temperature (°C)	Feed consumption (kg/d per head)	Daily growth (g/d per capo)	Feed convertion
10	3,50	800	4,37
15	3,15	790	3,99
20	3,22	850	3,79
25	2,63	720	3,65
30	2,21	450	4,91
35	1,51	310	4,87

Font: Nichols *et al.*, 1980.

The **mean radiant temperature** takes into account the heat exchanges by radiation and is measured with special instruments called Globe thermometers

Microclimate control



Air temperature suggested for fattening pigs in collective pens

a=slatted floor

b=solid floor

c=straw bedded floor

Microclimate control

Table - Suggested ranges of temperatures for breeding pigs, piglets and weaners

Category	Temperature (°C)
Boar in individual pen:	
- partially slatted floor	18÷20
- solid floor	16÷18
- straw bedded floor	14÷16
Pregnant sow:	
- individual housing	19÷20
- group housing, partially slatted floor	17÷18
- group housing, solid floor	15÷16
- group housing, straw bedded floor	13÷14
Lactating sow:	
- slatted floor	18÷20
- straw bedded floor	16÷18
Piglets (nest area):	
- at birth	32÷35
- 1st week	28÷30
- 2nd week	26÷28
- 3rd week	24÷26
- 4th week	22÷24
Weaners (start):	
- slatted floor	27÷28
- partially slatted floor	26÷27
- straw bedded floor	21÷22
Weaners (end):	
- slatted floor	20÷22
- partially slatted floor	18÷20
- straw bedded floor	16÷18

Air temperature measured at the animal height

Microclimate control

The rate of **air humidity** is an environmental parameter that can have a major influence on animal welfare.

Absolute humidity in the pig house (AH), is the amount of steam in grams contained in 1 m^3 of air.

It is affected by:

- external humidity
- evaporation of water inside the building (water troughs, tanks, wash water, etc.)
- evaporation from pigs
- ventilation flow rate

Microclimate control

Relative humidity (RH) is the ratio between the actual amount of water vapor in the air at a given temperature and the maximum possible (saturated steam) at the same temperature.

Example: t_i = 25° C, *AU* = 14 g/kg;

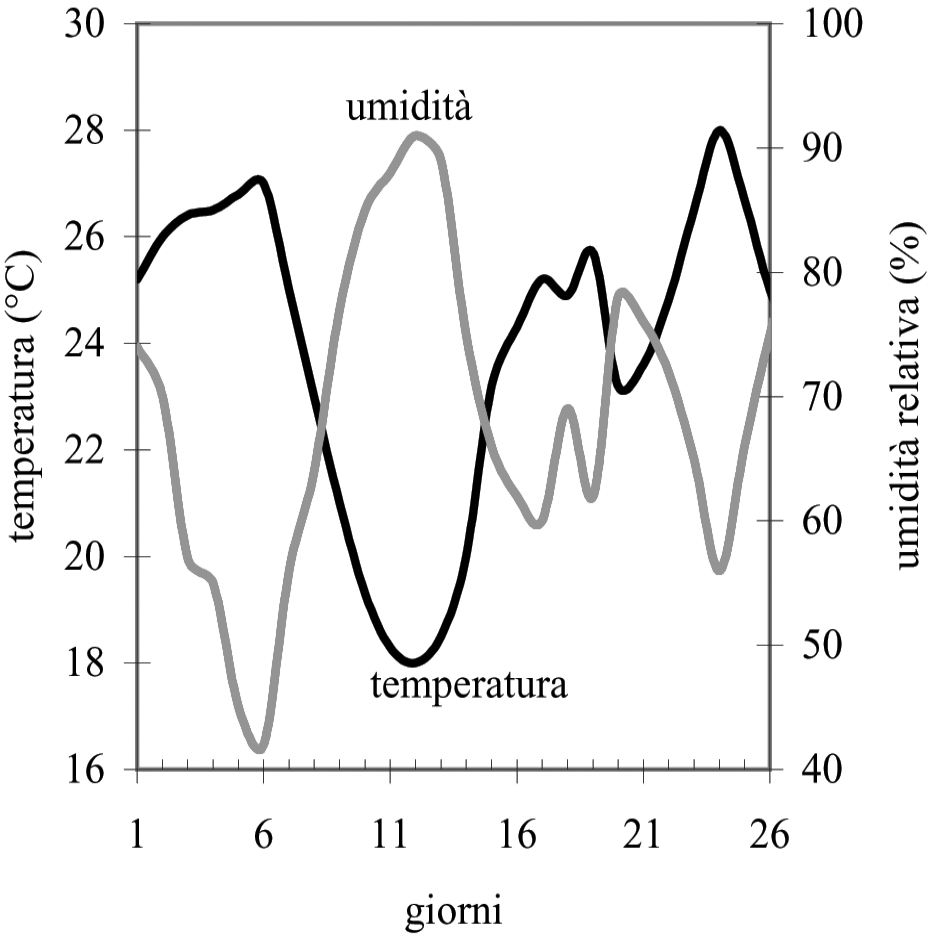
max quantity of steam in the air at t_i = 20,1 g/kg;

RH = 14 / 20,1 x 100 = **69,7%**

Microclimate control

Temperature (°C)	Relative Umidity (%)				
	70	75	80	85	90
-4	2,40	2,57	2,79	2,91	3,07
-2	3,00	3,21	3,43	3,64	3,86
0	3,56	3,82	4,05	4,34	4,61
2	4,12	4,42	4,66	5,02	5,33
4	4,69	5,03	5,30	5,72	6,07
6	5,30	5,68	5,99	6,45	6,85
8	5,96	6,38	6,74	7,25	7,70
10	6,69	7,16	7,58	8,14	8,63
12	7,51	8,04	8,53	9,13	9,68
14	8,44	9,03	9,61	10,25	10,86
16	9,49	10,16	10,84	11,53	12,21
18	10,68	11,44	12,23	12,98	13,75
20	12,03	12,88	13,80	14,63	15,49
22	13,55	14,51	15,58	16,48	17,45
24	15,25	16,35	17,57	18,57	19,66
26	17,16	18,40	19,80	20,91	22,14
28	19,27	20,68	22,27	23,51	24,90
30	21,62	23,20	25,01	26,40	27,96

Microclimate control



Air T and RH measured in a fattening unit

Microclimate control

Air speed (wind) causes an increase of **heat dispersion** by convection

Moreover, air movement promotes **evaporation** because removing the layer of air around the body and replacing it with drier air

Microclimate control

The **effects** on pigs are strictly correlated **to the air temperature inside the house**

WINTER: the increase in air velocity of 0.1 m/s corresponds to a decrease of about 1° C of temperature perceived by the animal (attention to smaller pigs and those reared individually).

SUMMER: increased air speed is favorable because it reduce thermal stress by accelerating heat loss and evaporation from the skin

Microclimate control

For indoor kept pigs microclimate control happens in two steps:

- **step 1**: from the **pig** to the **indoor environment** around it (physiological aspects of animal production are relevant as well as the mechanisms that the pig can put in place to protect itself against cold and hot)
- **step 2**: relationship between the **indoor environment and the outdoor environment**, mostly in terms of thermal balance (thermal insulation and ventilation are relevant)

Microclimate control

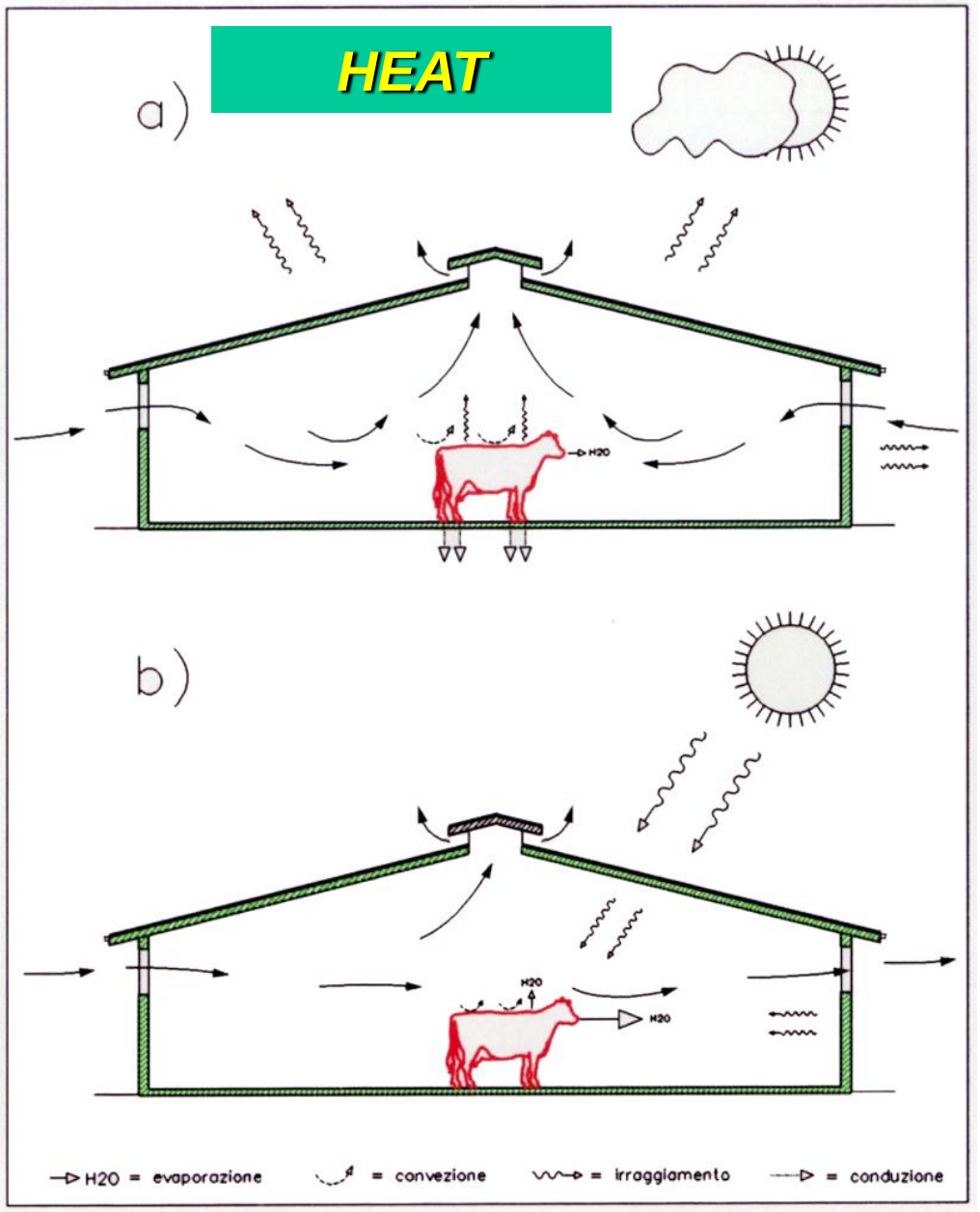
The pig in an **homeotherm** animal, that needs to mantain a constant level of its internal body temperature (about 39° C) in order to safeguard the body's vital functions. To achieve this, the animal must balance the production and dispersion of heat, the heat produced for its maintenance (Φm) and production (Φp) must be equal to the total heat lost (Φ_T):

$$\Phi m + \Phi p = \Phi_T$$

Microclimate control

To comply with the **heat equation** it is necessary that the heat is dissipated through the body of the pig, this can be done basically in two ways: as **sensible heat** (Φs) and as **latent heat** (Φl):

$$\Phi_T = \Phi s + \Phi l$$



BTSF
Better Training for Safer Food

Sensible heat:

- convection
- condution
- radiation

Latent heat

(1 l/h = 0,681 kWh)

Executive Agency for Health and Consumers

Microclimate control

Essential factors:

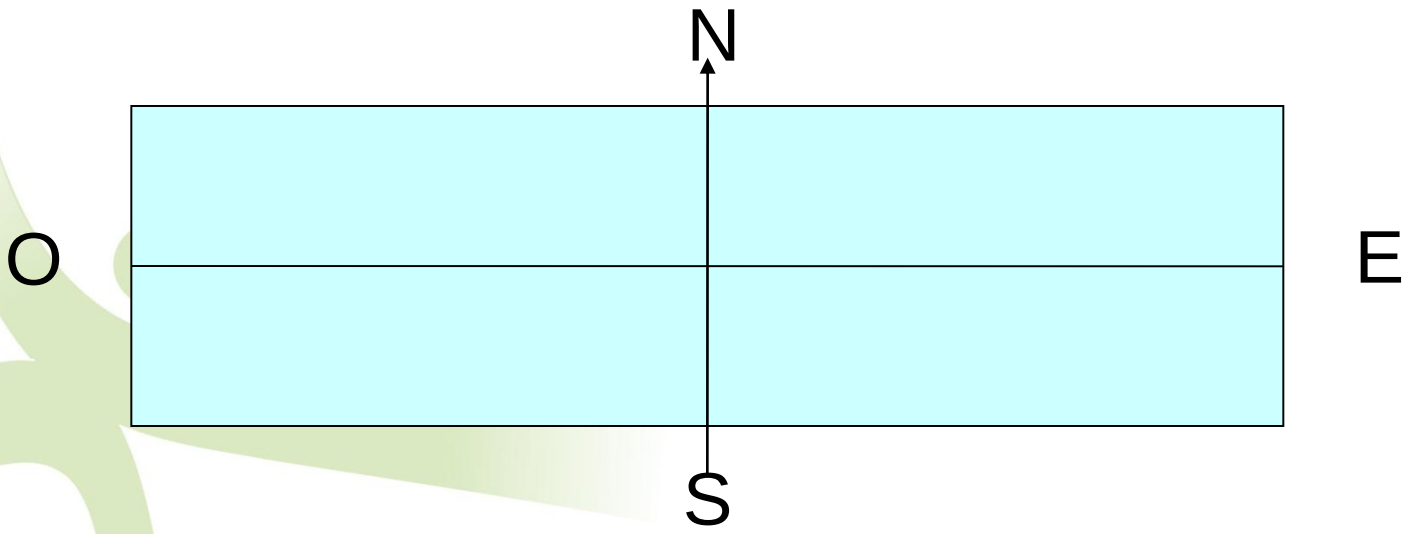
- orientation
- insulation
- ventilation
- shading
- cooling
- heating

Microclimate control

Est-West orientation is more suitable beacuse:

•esposition of the building to solar radiance is reduced

• it promotes natual ventilation due to the higher difference of temperatures between the surface of the two opposed long lateral walls



Microclimate control

Ventilation is very important because:

•replaces **toxic gases** with oxigen

•removes **steam** and **heat**

•removes **dust**

Table – Maximal concentration of noxious gases in animal houses

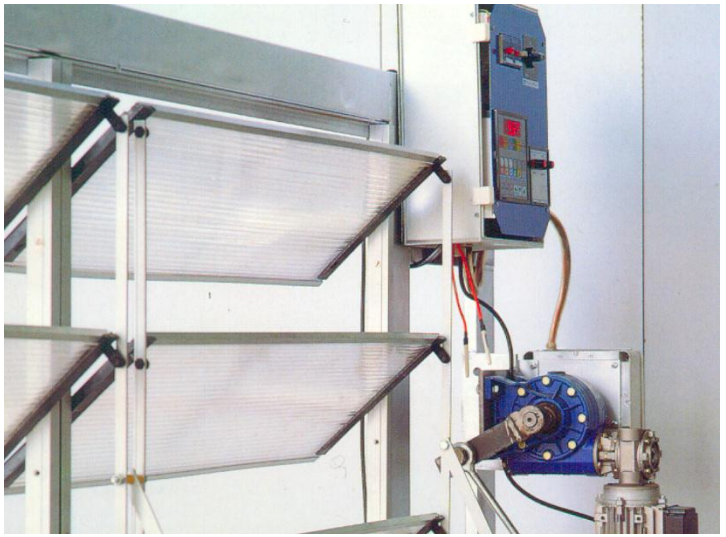
Esposition	NH_3 (ppm)	CO_2 (ppm)	H_2S (ppm)
Prolonged	10	2.500	2,5
Short	25	5.000	10

Font: Barbari *et al.*, 1995.

Microclimate control

Natural ventilation: the air movement is due to natural physical fenomenon (difference of temperature, different height between incoming and outgoing air, wind)

Mechanical ventilation: the air movement is forced by the action of fans

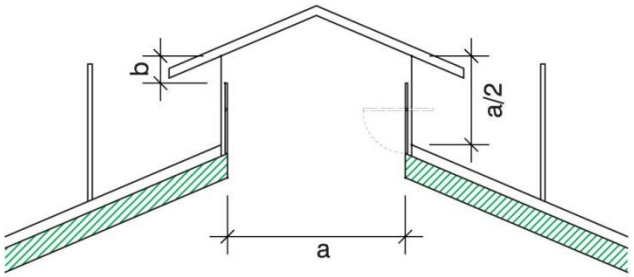


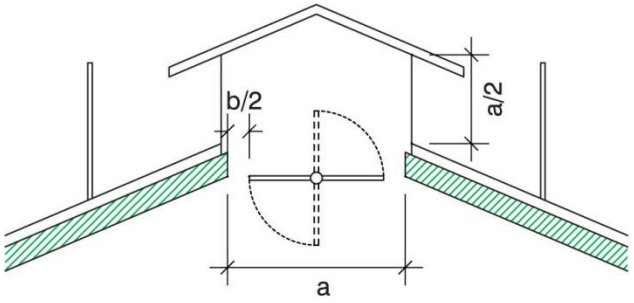
Microclimate control

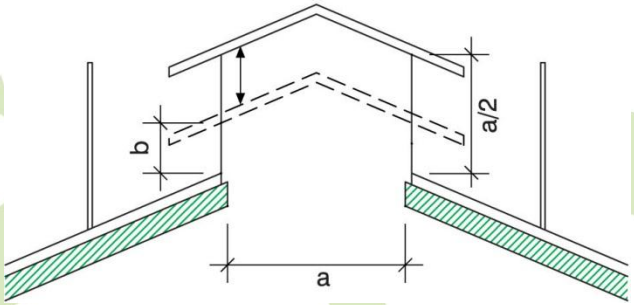
Minimal ventilation flow (winter) and **maximal** ventilation flow (summer) must be calculated, according to the load of animals and to indoor and outdoor reference conditions

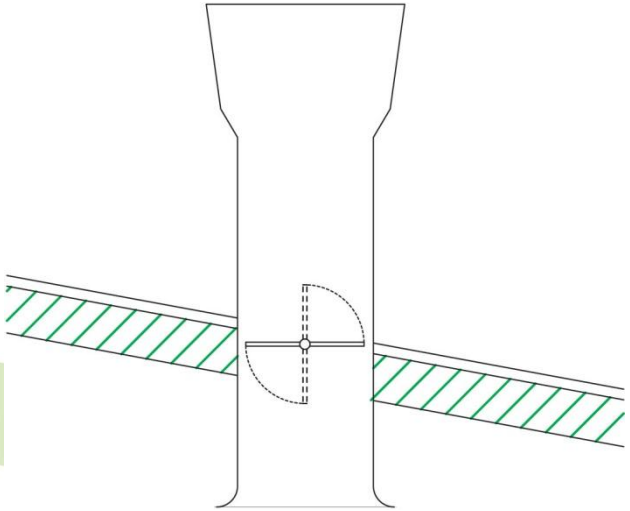
Minimal and maximal surfaces of air inlet and outlet must be established to allow effective natural ventilation and good thermal comfort

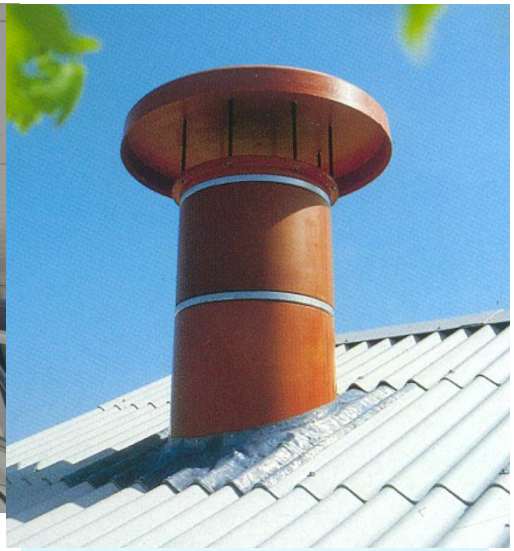
Microclimate control









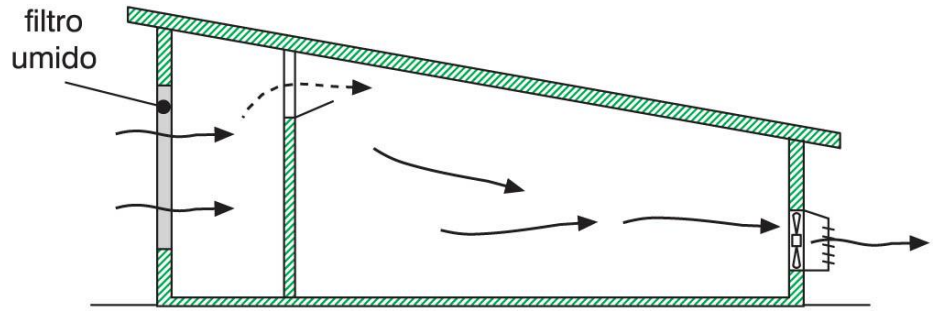


Microclimate control

Microclimate control

Cooling pads

a



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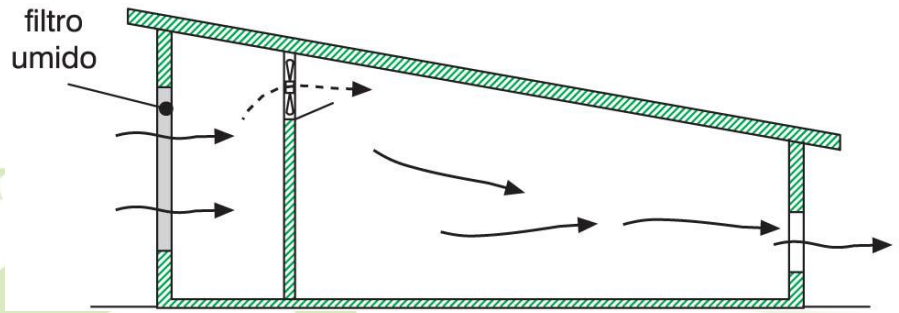
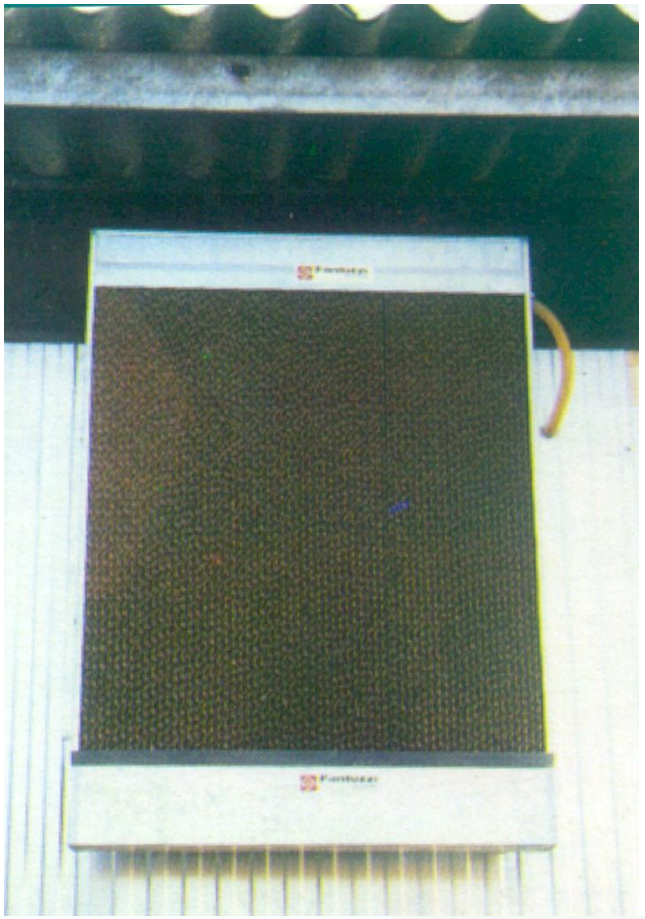
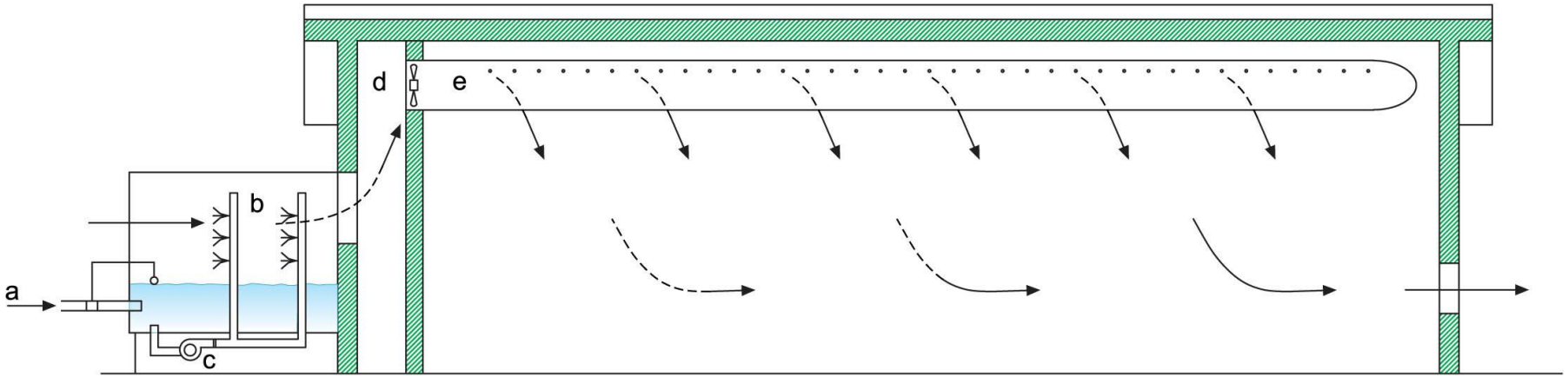




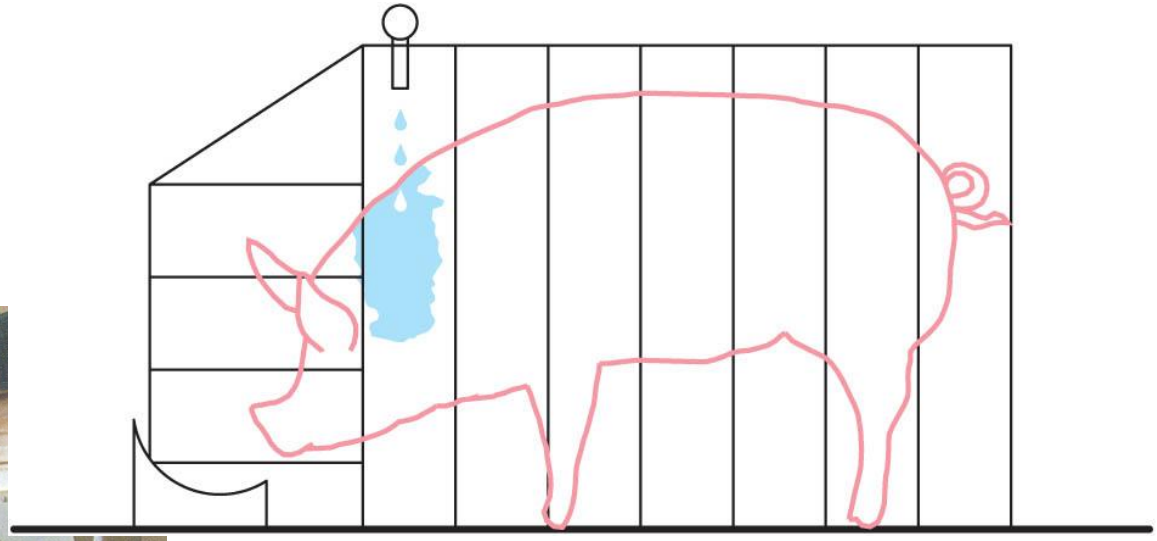
Microclimate control

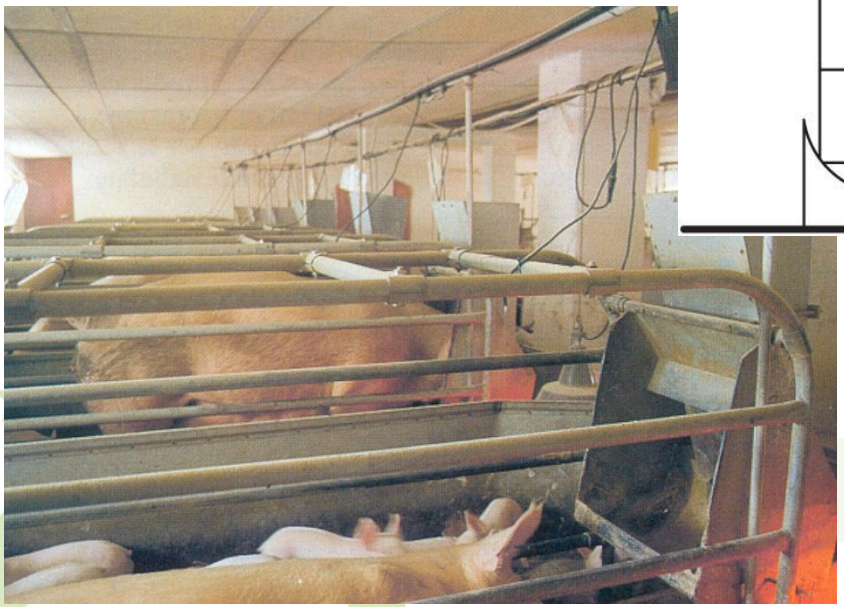
Adiabatic cooling



Microclimate control

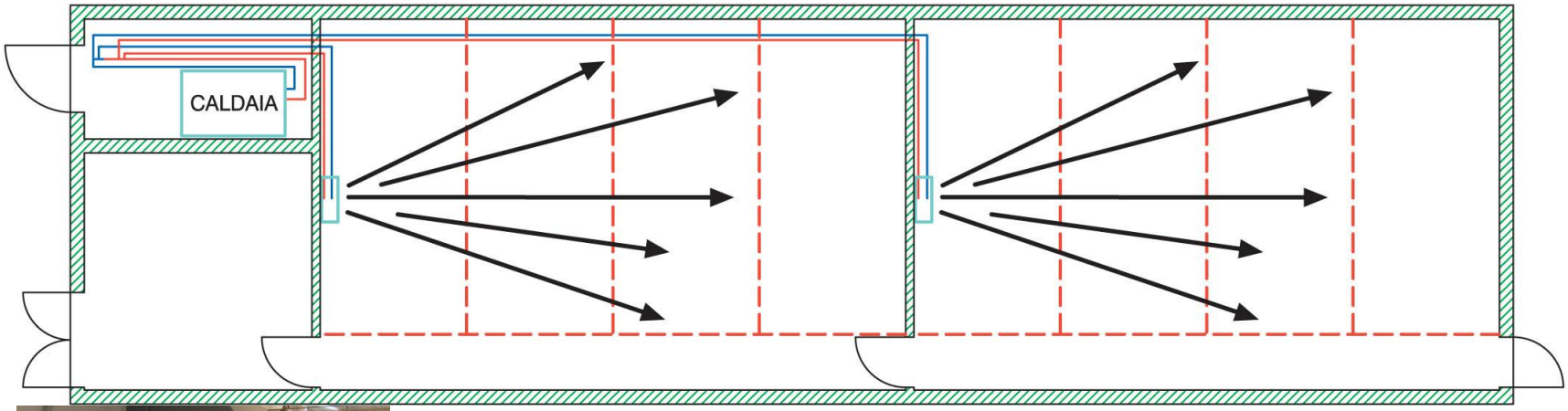
Concentrated irrigation





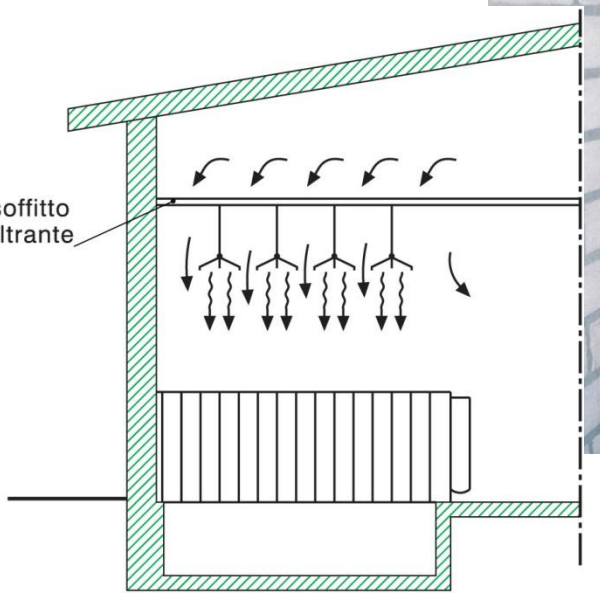
Microclimate control

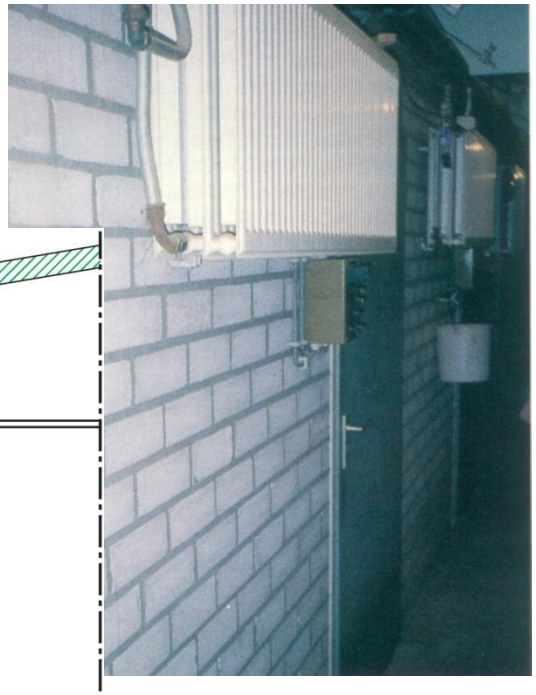
General heating by aerotherms



Microclimate control

General heating through finned tubes or radiators





Microclimate control

Localised heating by means of:

- IR lamps
- heated mats

Farm index systems

- estimate the potential of farming methods, structures and management to provide a certain level of welfare for farmed animals

- are based on technical parameters established and developed through research, experimentation and experience of farmers and technicians, besides the current legislation

- are not contrary or alternative of diagnostic systems, but simply offer a different service

The best-known index systems in Europe are the Austrian TGI (ANI = Animal Needs Index).

Farm index systems

- Since 1995 TGI 35L official welfare assessment system for organic farms in AU
- TG 200 is an advisory tool on organic farms in DE
- Both TGI systems rely on the application of design and to a lesser degree on management criteria and use only few semi-quantitative animal-based indicators.
- Defined areas of influence either to animals' freedom to express different behaviour pattern (TG 200) or to functional areas (TGI 35L), as well at to hygiene and management factors (TGI 200), or light, air and stockpersonship (TG 35L)
- Total index and area scores are expected to be positively correletad with the quality of husbandry conditions

IBA index system

Developed by CRPA and University of Florence (DIAF) within an experimental project funded by:
- Emilia-Romagna Region, Department of Agriculture (L.28/98)
- ASSER (Organization of pig producers in Emilia-Romagna)
- Parma ham Consortium

It is a farm index system (on-farm index system) based primarily on farming resources (resource-based system), which incorporates criteria and methodology of the already existing IBA Cattle (CRPA, UniBo, UniFi).

Scientific references

EFSA Opinions

CIGR - 2nd Report of Working group on climatization of animal houses. State University of Gent. Belgium, 1992.

CIGR - 4th Report of Working group on climatization of animal houses. Pedersen S. & Salvik K. Denmark. 2002.

ASABE - Dimensions of livestock and poultry. ASABE Standards.

IBA index system

IBA is not a tool for controlling ”compliance" with AW rules (this activity is the responsibility of official veterinary services), but obviously takes into account the AW rules

IBA is not the tool to assess the welfare of the animals, but one of the possible ways to approach this complex issue

IBA is a tool to advice farmers aiming to identify farming weaknesses, allowing the farmer to make targeted interventions in his farm in order to improve the welfare of their animals and farm profitability as well

IBA methodology

1) preparation of the checklist and its validation

2) filling in the checklist on farm

3) input data through specific software

4) monitoring and validation of data entered

5) scoring and determination of rules for the final farm classification of the company

IBA check lists

It can be used in any type of indoor pig farming
Depending on the type of farming varies the combination of different data collection sheets, which are:

- Form A / AA - General (breeding or fattening)
- Form B - Building / Room
- Form C - Service-pregnancy unit
- Form D - Nursery unit
- Form E - Weaning unit
- Form F - Fattening or Replacement units

Checklists, except for A / AA, can be filled by the assessor autonomously through inspection observation, measurement and evaluation

IBA check lists

The main investigated topics are:

- husbandry systems and housing structures
- facilities for quarantine and isolation
- microclimate control
- food and drinking water
- hygiene, health and animal behavior
- inspection of animals and equipment
- stockmanship

IBA check lists

Checklist ask for **descriptive** (without scoring), **codified** (code 1, 2, 3, etc..), **numerical** (input value derived from the questionnaire) or a **yes/no** answers

In addition, the software aided analysis gives automatic responses

The unit forms C, D, E and F include functions that return YES or NO to questions that have a direct reference to the legislation on pig welfare; hence NO is equivalent to a non-compliance for that particular aspect

IBA scoring

Higher maximum scores and negative minimum scores for aspects of greater relevance and more easily evaluated

Lower maximum scores for less relevant aspects and for parameter of more uncertain evaluation, such as those requiring a subjective assessment by the assessor

Positive or **negative** scores depend on whether the parameter is considered as a plus-value for the welfare, or its deficiency or lack is evaluated as bad

Identification of rules (non-compliance, conditions) for farm classification

IBA scoring

FORM AA - GENERAL for fattening and replacement units

AA1 Farm identity and altitude

AA2 General data

AA3 - Performance (on average in the last year)
mortality: score 1 m<3%; score 0 3<m<5%; score -1 m>5%

AA4 - Management
(un)loading area: Y/N
dedicated passageways to pens: Y/N
use of offensive tools (e.g. electric prod, sharp stick): Y/N
daily inspection: Y/N
further group mixing after first grouping: Y/N
isolation of aggressive or weakest heads: Y/N

AA5 - Annual inspection/service of equipment
(feeding, drinking, ventilation, heating, manure management): Y/N

IBA scoring

AA6 Staff

nr. and qualification of workers, training scholarship (scores 0, 1, 2)
nutrition advice, nutrition skilled worker

AA7 Drinking

water supply (municipal water net, farm well): both +0,5
annual microbiological analysis: -Y/N

AA9 Quarantine and isolation facilities

pig introduction: 0 empty; -1 partially full; 0,5 quarantine
quarantine: +1 far from piggery; +1 separate access
quarantine separated area for disinfection: Y/N
isolation facility: -2 none; +1 spec. structure; 0 spec area
bedding/no bedding: +1 Y; 0 N

AA10 Biosecurity

Periodical deratisation and flie control, all in / all out, vet advisory programme, filter areas for humans and vehicles, refrigerated container for dead pigs

IBA scoring

FORM B - Building

B2 Density Index (m^2/hpu)

score -1 DI<4; score 0 4<DI<8; score +1 DI>8
heat producing unit = pig producing 1 kW at 20° T

Pig category	hpu
Piglet 10kg lw	0,062
Weaner 20kg lw	0,096
Weaner 30kg lw	0,126
Grower 50kg lw	0,170
Grower 80kg lw	0,210
Finisher 100kg lw	0,224
Finisher 120kg lw	0,234
Finisher 150kg lw	0,240
Sow/pregnant gilt/boar	0,330
Farrowing sow+piglets	0,450

Max ventilation = hpu x 600 m3/h

B2/2A Roofing

score 0 monopitch, flat; score 1 double pitch

IBA scoring

B3 Ventilation type (natural(mechanical)

B3 Fun area
score -2 to +2,5 based on ratio actual/theorical in/out nat. ventilation area

B3/4 Regulation of natural ventilation flow
score -1 none; 0 manual; +1 automatic

B3/5 Distance from other buildings
score -1 to +1 based on more or less than 10 m for partial or total lenght

B6 Ventilation failure alarm (Y/N)

B7 Ventilation backup system (Y/N)

B3/calc8 Artificial lightening W/m^2
score 0 AL<1,5; 1,5<AL<2,49; AL>2,5 (fluorescent lamps)

IBA scoring

FORM F - Fattening / Replacement

F1 Housing system
score 0 total solid floor; score +1 solid + outddor run;
score +2 partial slatted floor + outdoor run; score +1,5 partial slatted floor;
score -1 total slatted floor; score + 3 total solid bedded area

F2 Calc1 Space allowance

F3/2 Manipulable materials
score +2 straw; +1,5 other bedding material; +1 rubber; +1 chain

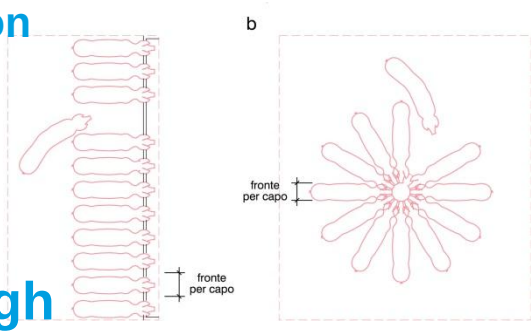
F3/5 Size of concrete slatted floor
slot size complying with EU rule; slat size complying with EU rule

F4/1 Drinking facilities
score +1 automatic; score 0 in trough or manger
score +1 nipples; score 0,5 water bowl

IBA scoring

F5/1 Feeding facilities

score 0 dry feeding; score +1 liquid feeding
score 0 resctricted feeding; score +0,5 ad lib
score 0 manual distribution; score +0,5 automatic distribution



F5/2 Manger type

score -1 on the floor; 0 other

F5/ Calc3 Ratio nr pigs/nr places at manger/trough

score -1, 0 or +1

Pig category	Linear trough width	Round trough width
Piglet 15 kg LW	0,20	0,15
Weaner 30 kg LW	0,24	0,18
Grower 50 kg LW	0,28	0,22
Grower 80 kg LW	0,34	0,26
Finisher 110 kg LW	0,37	0,28
Finisher 130 kg LW	0,39	0,30
Finisher 160 kg LW	0,42	0,32
Sow LW	0,43 0,55	0,34 0,46

IBA scoring

F5/4 Manger/trough construction material
score -1 wood; score 0 concrete; score 1 coated concrete
score 1 galvanised/inox steel or plastic

F6/1 Type of cooling system
score +1 emergency fan / spray or cooling pad systems
score +2 showers in pens

F6/3 Regulation of heating system
score 0 manual; score 0,5 automated

F6/3 Lesions assessment
score +1better; score 0 moderate; score -1 worse

F8/2 Cleanless score
score -3 to + 2

F8/2 Reaction to the assessor
score -1 fearful; score 0 moderately nervous; +1 relaxed

IBA breeding - final sheet

0		0		Min	Max		
A	General part	0,0		-15	40		**Yes**
B	Building/room	0,0		-14	20,5		**Yes**
C	Service/gestating unit	0,0		-22	33		**Yes**
D	Farrowing unit	0,0		-19,5	41		**Yes**
E	Weaning unit	0,0		-19,5	34		**Yes**
							Yes
GENE	**General score**	**0,0**		-15	40		
EDIF	**Building score**	**0,0**		-14	20,5		
CATE	**Pig categories score (units)**	**0,0**		-61	108		**Yes**
IBA	**Farm Animal welfare Index**	**0,0**		**-90**	**168,5**		
Classification effective IBA (IBAR)		**-**					00/01/00
-							0
		1					
	Classification potential IBA (IBAP)	1	1				**15/03/04**
		1					38061

IBA fattening - final sheet

0		0		Mn	Max		
AA	General part	0,0		-13	31		
B	Building/room	0,0		-14	20,5		SI
F	Rearing-fattening unit (gilt)	0,0		-17,5	32		SI
GENE	Genenral score	0,0		-13	31		
EDIF	Building score	0,0		-14	20,5		SI
CATE	Pig categories score (units)	0,0		-17,5	32		
IBA	Farm AWindex	0,0		-44,5	83,5		SI
Classification effective IBA (IBAR)		-					00/01/00
-							0
		1					
	Classification potential IBA (IBAP)	1	1				15/03/04
		1					38061

Farm classification

Classification of 38 pig farms (16 BF + 6 F) according to IBA farm index

IBA class	Breeding		Fattening	
	Potential IBA	Actual IBA	Potential IBA	Actual IBA
Non-complying	0	15	0	32
Low level	0	0	12	5
Sufficient level	1	0	28	16
Medium level	6	1	21	8
Good level	6	0	6	6
Optimal level	3	0	0	0

IBA is used currently to establish lists of priority for pig farms accessing to incentives for improved animal welfare of Rural development programme of RER

Conclusions

Animal welfare may help pig farmers to improve housing and husbandry techniques in order to improve health status and productive performances too

THE OPPORTUNITY: consider animal welfare even beyond the minimum requirements of the law, as a basic condition to improve farm efficiency and to differentiate livestock production

THE THREAT: See this issue only as a further complication of the rules imposed on farms

Conclusions

Comparison between outcomes of RB and AB assessement for the same criteria and circumstances will be welcome to understand:

- how much ABM are likely to be useful to check compliance of pig farms with AW rules
- how much housing systems and management (RBM) affect the welfare of pigs (ABM) in order to collect useful information for designing and testing innovations in terms of animal friendly housing systems

Conclusions

Further research is welcome to analyse (dis)advantages and Cost&Benefits of upgraded AW standards

Production costs are likely to raise in the first years after important interventions on housing and equipment due to investments and animal adaptation but then they usually decrease because of the positive effects on the animals (improved welfare, health and performances)

A previous experience of CRPA in assessing AW in dairy cattle farms by means of RBM (IBA) has shown lowest production costs in farms with highest scores indicating highest levels of AW

Thanks for your attention