THE WELFARE OF ANIMALS IN PRODUCTION SYSTEMS

General Principles and Underlying Research

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General principles for the welfare of animals in livestock production systems
1. Genetic selection should always take into account the health and welfare of animals.
Traditional genetics

- Production gains (growth, yield, reproduction)
Traditional genetics

- Production gains (growth, yield, reproduction)

Animal welfare research

- Correlated health effects
- Fit between genetics and environment
- mastitis
- lameness
- metabolic disorders
- short life span
• mastitis
• lameness
• metabolic disorders
• short life span
Solutions:
• broader selection indices
• counter-selection
• use of indigenous genetics
2. The physical environment, including the substrate (walking surface, resting surface etc.), should be suited to the species and breed, so as to minimise risk of injury and transmission of diseases or parasites to animals.
Ragnar Tauson
• foot lesions
• neck lesions
• feather damage
• overgrown claws
3. The physical environment should allow
• comfortable resting,
• safe and comfortable movement including normal postural changes, and
• the opportunity to perform types of natural behaviour that animals are motivated to perform
Suck + Frequent Meals
Suck + Frequent Meals
• stimulates digestive hormones
Suck + Frequent Meals
- stimulates digestive hormones
- greater intake
Suck + Frequent Meals
• stimulates digestive hormones
• greater intake
• allows group housing
4. Social grouping of animals should be managed to allow positive social behaviour and minimise injury, distress and chronic fear.
Mounting by intact males kept in groups of similar age

Photo: Ingemar Hansson
Body weight gain of sows (kg)

5. Air quality, temperature and humidity in confined spaces should support good animal health and not be aversive to animals.

Where extreme conditions occur, animals should not be prevented from using their natural methods of thermo-regulation.
## Performance of broiler chickens

<table>
<thead>
<tr>
<th>Ammonia (ppm)</th>
<th>Deaths (%)</th>
<th>Reduction in body wt (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ppm</td>
<td>5.8</td>
<td>-</td>
</tr>
<tr>
<td>25 ppm</td>
<td>2.8</td>
<td>2</td>
</tr>
<tr>
<td>50 ppm</td>
<td>10.6</td>
<td>17</td>
</tr>
<tr>
<td>75 ppm</td>
<td>13.9</td>
<td>21</td>
</tr>
</tbody>
</table>

D.M. Miles et al. 2004, Poultry Science 83: 1650-1654
Other issues:

• Poor air quality can increase the risk of infectious diseases
• Hot, humid conditions can suppress growth, reproduction and survival
6. Animals should have access to sufficient feed and water, suited to the animals’ age and needs
  • to maintain normal health and productivity, &
  • to prevent prolonged hunger, thirst, malnutrition or dehydration.
Traditional Nutrition

• Diet composition (protein, energy, micro-nutrients)
Traditional Nutrition

- Diet composition (protein, energy, micro-nutrients)

Animal welfare research

- Access to feed and water
- Effects of feeding systems
Franklin Loew 1939-2003
Polioencephalomalacia in cattle
Other problems:

- rumen acidosis from high-grain diets for cattle
- behavioural abnormalities from low-fibre diets for pigs or horses
- poor feeder and drinker design
7. Diseases and parasites should be prevented and controlled as much as possible through good management practices.

Animals with serious health problems should be isolated and treated promptly or killed humanely if treatment is not feasible or recovery is unlikely.
Preventive veterinary medicine / Animal hygiene

- individual treatment
- hygiene practices
- disease barriers
- regional and global programs
For humane euthanasia of cattle, the point of entry of a projectile should be at the intersection of two imaginary lines, each drawn from the outside corner of the eye to the base of the opposite horn. The entry point should be high in the center of the forehead but not between the eyes.
8. Where painful procedures cannot be avoided, the resulting pain should be managed to the extent that available methods allow.
Other research has led to:

- less painful alternatives
- elimination of certain procedures
9. The handling of animals should foster a positive relationship between humans and animals and should not cause injury, panic, lasting fear or avoidable stress.
Human-Livestock Interactions
2nd Edition

Paul H. Hemsworth and Grahame J. Coleman

Paul Hemsworth
Negative handling of dairy cows: slaps, hits, pushes, tail-twists

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance of handler</td>
<td>+0.33</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Cortisol in milk</td>
<td>+0.34</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Yearly milk yield</td>
<td>-0.36</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Based on Hemsworth and Coleman, 1998

Negative handling

Chronic fear

Classic stress response

Reduced:
- Growth
- Reproduction
- Immune competence
Negative handling

Chronic fear

Classic stress response

Reduced:
- Growth
- Reproduction
- Immune competence

Based on Hemsworth and Coleman, 2011
10. Owners and handlers should have sufficient skill and knowledge to ensure that animals are treated in accordance with these principles.
Selection and training of staff can:
- avoid the cascade of fear, stress and its effects on performance
- allow animals to be moved without injury
- eliminate most use of electric prods and other fear-producing equipment
Animal welfare, animal husbandry, veterinary science
Animal Husbandry

- Feeding
- Breeding
- Health care
- Handling
- Management
- Housing
Animal Husbandry
- Feeding
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Animal/Vet. Science
- Nutrition
- Genetics/reproduction
- Vet. Science
Animal behaviour

Konrad Lorenz, 1903-1989
Stress Physiology

Hans Selye, 1907-1982
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Animal Welfare Science
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Animal Welfare Science