

## TECHNICAL REPORT OF EFSA

### Public call for data

on

### health and welfare aspects of genetic selection of broilers<sup>1</sup>

European Food Safety Authority<sup>2</sup>

European Food Safety Authority (EFSA), Parma, Italy

#### ABSTRACT

The European Commission has requested the European Food Safety Authority (EFSA) to gather and assess all data available and produce two scientific opinions on: the influence of genetic selection on the welfare and resistance to stress of commercial broilers; and the welfare aspects of housing and management for broiler breeders. In response to that request, the Animal Health and Welfare (AHAW) Unit and the Data Collection and Exposure (DATEX) Unit have launched a public call for data. The call was based on 19 specific questions and was open from July 11<sup>th</sup> to October 15<sup>th</sup> 2009. A Technical Meeting was held on the 23<sup>rd</sup> of September 2009 with AHAW stakeholders to ensure best responses to the call. Governmental bodies, interested organisations, producer associations, breeding companies, universities, research institutions, and few individuals have submitted information in response to the call for data. A total of 184 contributions were received from 13 individual sources. The information collected was transmitted to the recipients of an Article 36 grant (the TOGA project consortium) to be included in the systematic review process to be performed on health and welfare aspects of genetic selection in broilers.

#### KEY WORDS

Meat producing chicken, broiler, broiler breeders, genetic selection, health, welfare, diseases

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1 On request of EFSA, Question No EFSA-Q-2009-00797, issued on 31 October 2009.

2 Correspondence: AHAW@efsa.europa.eu

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## TABLE OF CONTENTS

Abstract .....	1
Table of contents .....	2
Background .....	3
Terms of reference .....	3
Acknowledgements .....	3
The call for data .....	4
1. Introduction .....	4
2. EFSA call for data .....	5
2.1. Information required .....	5
2.1.1. Genetic selection of broilers .....	5
2.1.2. Management and housing of broiler breeders .....	5
2.1.3. Resistance to stress and infectious diseases .....	6
2.1.4. Other questions .....	6
2.2. Confidentiality .....	6
3. Data received by EFSA .....	7
Concluding remark .....	7
Appendix A. Mandate submitted by the European Commission .....	8
Appendix B. Source, nature and type of contributions received by EFSA .....	9
Abbreviations .....	195

## BACKGROUND

The 2000 report<sup>3</sup> of the Scientific Committee on Animal Health and Animal Welfare on the welfare of broilers concluded that a wide range of metabolic and behavioural traits in broilers have been changed by selection practices. The report concluded that many welfare problems in broilers seem to emanate from the way the animals and the parent stocks are bred.

Council Directive 2007/43/EC laying down minimum rules for the protection of chickens kept for meat production calls for the European Commission to submit to the European Parliament and Council a report concerning the influence of genetic selection on identified deficiencies resulting in poor welfare of chickens.

The European Commission has requested European Food Safety Authority (EFSA) to assess all relevant available information from scientific studies and proprietary sources. The European Commission has also requested EFSA to issue two Scientific Opinions: the first one on the influence of genetic selection on the welfare and resistance to stress of commercial broilers and the second one on the welfare of broiler parent and grandparent stocks raised and kept for breeding purposes. The background and terms of reference of the mandate received from the European Commission is appended to this report (Appendix A).

## TERMS OF REFERENCE

In order to ensure EFSA scientific outputs based on comprehensive, relevant information, and to respond to the request from the European Commission to assess all relevant available information on the matter, the Animal Health and Welfare (AHAW) Unit is requested to launch a public call for data in collaboration with the Data Collection and Exposure (DATEX) Unit.

## ACKNOWLEDGEMENTS

The European Food Safety Authority wishes to thank the members of the following Working Groups for the preparation of this public call for data.

Working Group on the influence of genetic parameters on the welfare and the resistance to stress of commercial broilers: David Morton (Panel member, Chair), Toni Oltenacu (Panel member, Rapporteur), Poul Sørensen, Elizabeth Le Bihan-Duval, Paul Hocking, Cécile Arnould, and Lisa Collins.

Working Group on the welfare aspects of management and housing of grand-parent and parent stocks raised and kept for breeding purposes: Joerg Hartung (Panel member, Chair), Linda Keeling (Panel member, Rapporteur), Lotta Berg, Virginie Michel, Ingrid de Jong, and Georgios Banos.

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<sup>3</sup> SCAHAW, 2000. The welfare of chickens kept for meat production (broilers). Report of the scientific committee on animal health and animal welfare (adopted 21 March 2000), European commission, Health and consumer protection directorate-general. pp149

## THE CALL FOR DATA

### 1. Introduction

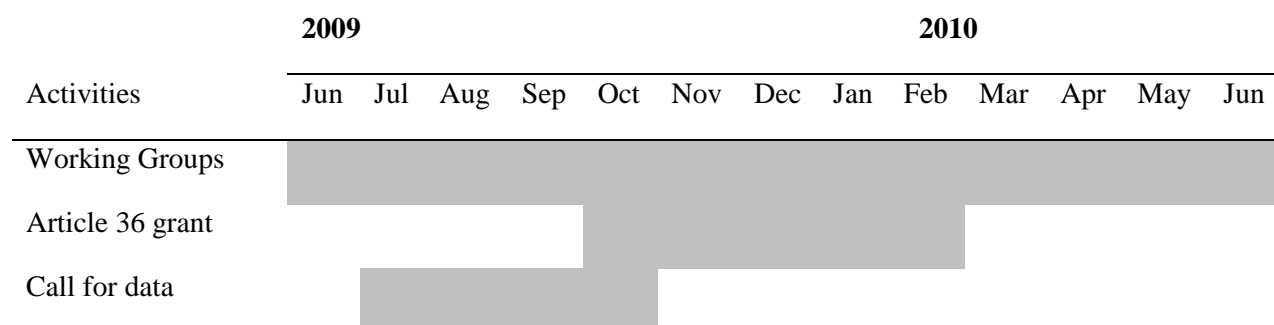
The European Commission has requested the European Food Safety Authority (EFSA) to gather and assess all data available and produce two scientific opinions on: i) the influence of genetic selection on the welfare and resistance to stress of commercial broilers; and ii) the welfare aspects of housing and management of broiler breeders. Based on these opinions, the Commission will submit a report concerning the influence of genetic parameters on the welfare of chickens to the European Parliament and to the Council<sup>4</sup>.

In order to support the work of the Animal Health and Welfare (AHAW) Panel, two ad hoc expert working groups have been established to draft a scientific report on the current knowledge on welfare aspects of genetic selection in broilers and broiler breeders. This scientific report will constitute the scientific ground for the two Scientific Opinions to be adopted by the AHAW panel before the 30<sup>th</sup> of June 2010.

In parallel, EFSA called for proposals in application of the Article 36<sup>5</sup> of its founding regulation to carry out data collection, integrate data from the public call for data, and process with their systematic evaluation. Proposals should assist the ad hoc expert working groups to assess current knowledge on welfare aspects of genetic selection in broilers and broiler breeders.

A public call for data<sup>6</sup> on the welfare aspects of genetic selection in broilers and the welfare aspects of the management and housing of the broiler breeders has been launched by EFSA. This call was designed to facilitate the data collection requested by the European Commission and ensure that the scientific opinions of the AHAW panel are based on all available published scientific studies and proprietary information relevant to the subject. Further to welfare aspects, the Commission also mentioned a possible request to assess the influence of genetic selection of commercial broilers towards resistance to disease agents. Therefore it was decided that the call should also encompass animal health aspects of genetic selection in broilers.

The Gantt chart below provides an overview of the activities undertaken by EFSA on the matter:



The Animal Health and Welfare (AHAW) Unit held a Technical Meeting<sup>7</sup> with its stakeholders in order to ensure collection of comprehensive, relevant information.

<sup>4</sup> OJ L 182, 12.7.2007, p. 19-28

<sup>5</sup> CFP/EFSA/AHAW/2009/02

<sup>6</sup> [http://www.efsa.europa.eu/EFSA/efsa\\_locale-1178620753812\\_1211902687473.htm](http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1211902687473.htm)

<sup>7</sup> [http://www.efsa.europa.eu/EFSA/efsa\\_locale-1178620753812\\_1211902787079.htm](http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1211902787079.htm)

This report presents the results of the public call for data on health and welfare aspects of genetic selection of broilers.

## **2. EFSA call for data**

EFSA asked governments, interested organisations, breeding companies, universities, research institutions, other stakeholders and any individuals to submit any available data relevant to specific areas pertaining to health and welfare aspects of genetic selection in broilers.

### **2.1. Information required**

The call specifically indicated that both data and/or information published in peer reviewed papers, but also technical studies or reports related to the questions/issues listed below were acceptable. It was also indicated that quantitative data were preferred whenever possible. Quantitative data were requested to be submitted with all information needed to evaluate the robustness of the dataset (e.g. data analysis, sample selection and sources of information).

#### **2.1.1. Genetic selection of broilers**

The questions on the genetic selection of broiler chickens were:

- Traits that are selected for in the breeding of male and female lines (e.g. growth rate, productivity, robustness, disease resistance, feed conversion, fertility, behaviour), including the definition of these traits, age and mode of measurement, as well as any weighting, that are used for broilers reared in commercial meat production. Relative emphasis placed on these traits in a selection index. Variation with the desired end-product e.g. slaughter age/weight, valuable parts). Selection of traits/genes which could be associated with poor welfare or promote good welfare.
- Welfare effect of genetic selection for the broilers concerned in terms of suffering (to be described by intensity, duration, the number of affected birds including data on incidence and prevalence of condition).
- Interactions between genetics and husbandry and management systems and climate; how strong are these interactions. Specify if the selected lines (or their products) are tested in challenging (i.e. sub-optimal) environments in order to evaluate their robustness/adaptability.
- Numerical data on the numbers of broilers kept in different systems within the EU.

#### **2.1.2. Management and housing of broiler breeders**

In the context of this call broiler breeders mean parents and grandparents.

The questions on the management and housing of broiler breeders were:

- Effect of the husbandry system (in its broadest sense and including management and climate) on the welfare and health (including metabolic and non infectious diseases) of broiler breeders during the rearing and breeding periods.
- Specific management factors (e.g. feeding, ventilation, litter type and structure, etc) that affect welfare.

- Welfare effect of management and housing for the broiler breeders in terms of suffering (described by intensity, duration, the number of affected birds including data on incidence and prevalence of the condition).
- Different systems of husbandry required for the different breeding lines or strains or sexes and their technical specifications.
- Numerical data on the numbers of breeding birds and numbers kept in different systems within the EU.
- Proportion of broiler breeders (parents and grandparents) reproduced by natural vs. artificial insemination. Specify if this vary according to the genetic type.
- Effect of the genetic selection applied in the meat-type lines on the reproductive capacities of the male and female broiler breeders. Strategies applied to preserve the reproductive performances of the broiler breeders.

### **2.1.3. Resistance to stress and infectious diseases**

The questions on the issue of resistance to stress and infectious diseases were:

- Numerical data on the incidence and prevalence of infectious disease in breeding birds, and the numbers affected in different systems of husbandry within the EU.
- Influence of genetic selection on the resistance to stress and disease agents of commercial broilers, including, but not being limited to, genetic and phenotypic trends.
- Influence of genetic selection of commercial broilers on the use of antimicrobials, antimicrobial resistance, changes in the immune response or resistance to specific production and infectious diseases.

### **2.1.4. Other questions**

The questions were:

- Evidence for of genetic and phenotypic trends in the welfare traits of broilers and broiler breeders and in their management and housing.
- Existing monitoring of welfare and health traits (document what traits are concerned and how this information is used in the breeding schemes).
- Regulations or guidelines in EU Member states for parent flocks.
- Any novel techniques being used to genetically engineer birds e.g. to make them resistant to a disease.
- Any other relevant questions that have not been considered above and that could affect bird welfare or genetic selection excluding economic, ethical, social or cultural aspects.

## **2.2. Confidentiality**

In the call, EFSA recognised that some required information may be unpublished and of a confidential nature. It was clarified that such a type of data will remain the property of the owner of the original material and will be treated by EFSA with maximum confidentiality. However, EFSA clarified its

intention to give access to data/information for the recipients of an Article 36 grant and for the members of the AHAW Panel working groups.

No specific issues related to confidentiality have been requested by participants to be further discussed between the information owners and EFSA. Therefore, it was assumed that all information and data collected are open to the members of the TOGA project (recipient of the Article 36 grant CFP/EFSA/AHAW/2009/02) as well as for the members of the two relevant AHAW Panel working groups<sup>8,9</sup>.

### **3. Data received by EFSA**

Governmental bodies, interested organisations, breeding companies, universities, research institutions, and several individuals have submitted information in response to the call for data. A total of 184 contributions were received from 13 individual sources. The collection of data contains peer reviewed articles published in scientific journals. It also contains reports, reviews, notes, and datasets. The Appendix B indicates the type of information that has been provided to EFSA. The information was categorised as follows: report, paper, thesis, statement, regulation, guidelines, and data set. A total of 53 reports, 44 published papers or manuscripts, 3 thesis dissertations, 21 statements, 2 regulations, 52 guidelines, and 9 data sets were received. The collection contains some duplicates, submitted by multiple sources.

Details of the contributions are given in Appendix B.

### **CONCLUDING REMARK**

The information collected by AHAW was transmitted to the TOGA project consortium to be included in the systematic review process to be performed on health and welfare aspects of genetic selection in broilers.

The information collected was also shared with the members of the two relevant AHAW Panel working groups (AHAW Working Group on the welfare aspects of management and housing of grand-parent and parent stocks raised and kept for breeding purposes; and AHAW Working Group on the influence of genetic parameters on the welfare and the resistance to stress of commercial broilers).

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<sup>8</sup> Working Group on the welfare aspects of management and housing of grand-parent and parent stocks raised and kept for breeding purposes: Joerg Hartung (Panel member, Chair), Linda Keeling (Panel member, co-Chair), Lotta Berg, Virginie Michel, Ingrid de Jong, and Georgios Banos.

<sup>9</sup> Working Group on the influence of genetic parameters on the welfare and the resistance to stress of commercial broilers: David Morton (Panel member, Chair), Toni Oltenacu (Panel member, co-Chair), Poul Sørensen, Elizabeth Le Bihan-Duval, Paul Hocking, Cécile Arnould, and Lisa Collins.

## **APPENDIX A. MANDATE SUBMITTED BY THE EUROPEAN COMMISSION**

### **Background as provided by the commission**

The Community Action Plan on the Protection and Welfare of Animals has as one of the main areas of action “upgrading existing minimum standards for animal protection and welfare as well as possibly elaborating minimum standards for species or issues that are not currently addressed in EU legislation”.

Council Directive 2007/43/EC laying down minimum rules for the protection of chickens kept for meat production calls for the Commission to submit to the European Parliament and to the Council a report concerning the influence of genetic parameters on identified deficiencies resulting in poor welfare of chickens.

The report of the Scientific Committee on Animal Health and Animal Welfare of 21 March 2000 on the Welfare of Chickens Kept for Meat Production (Broilers) concluded that a wide range of metabolic and behavioural traits in broilers has been changed by selection practices. It seems that many welfare problems in broilers emanate from the way the animals and the parent stock are bred. In particular, major concerns for animal welfare are the metabolic disorders resulting in leg problems, ascites and sudden death syndrome and other health problems. Genetic selection practises might as well influence resistance to stress. The report also concluded there are also welfare concerns about the way broiler breeder birds themselves are kept in particular with regards to feed and space restrictions.

### **Terms of reference as provided by the commission**

The Commission therefore considers it opportune to request EFSA to assess all the scientific and commercial information available on the genetics of broilers as well as on the welfare of grandparent and parent stocks and then to issue two scientific opinions, the first one on the influence of these genetic parameters on the welfare and the resistance to stress of commercial broilers and the second one on the welfare of grand-parent and parent stocks raised and kept for breeding purposes.

It is preferable to carry out the assessments in two steps.

As first step of the mandate, all data available worldwide on genetics either from scientific studies or from stakeholders and breeding companies should be collected and assessed. Furthermore, the data on the welfare aspects of the management and housing of the grand-parents and parents stocks raised and kept for breeding purposes should be also collected and assessed. Account should be taken of the results of the research project entitled “Broiler breeder production, solving the paradox” as well as of the new scientific development in this area. The above mentioned scientific and commercial data should be assessed by 28 February 2010.

As a second step and considering the Scientific Report provided from the data collection, two parallel Scientific Opinions, following a harmonised approach, should be developed:

- to assess which elements of broiler breeder bird selection have an impact on the welfare of commercial broilers and on their resistance to stress. Recommendations on how negative impacts could be minimised through different selection criteria should be issued.
- to address the welfare aspects of the management and housing of the grand-parent and parent stocks raised and kept for breeding purposes.

On the basis of the results of the data collection, the terms of reference of the two scientific opinions may be more precisely redefined.



## APPENDIX B. SOURCE, NATURE AND TYPE OF CONTRIBUTIONS RECEIVED BY EFSA

The contributions have been organised based on principles of the Dublin Core Metadata Initiative<sup>10</sup>.

### Individual

#	A reference number for the contribution
Contributor	An entity (person, an organization, or a service) responsible for making contributions to the resource.
Creator	An entity primarily responsible for making the resource. The name of a Creator may be used to indicate the entity.
Date	Date of production (publication) of the resource.
Title	A name given to the resource.
Description	An account of the resource. Description may include but is not limited to: an abstract, a table of contents, a graphical representation, or a free-text account of the resource.
Subject	The topic of the resource. Typically, the subject is represented using keywords.
Coverage	The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant.
Format	The file format, physical medium.
Identifier	An external identifier of the resource.
Language	A language of the resource.
Publisher	An entity responsible for making the resource available.
Relation	A related resource within this call.
Rights	Information about rights held in and over the resource. Typically, rights information includes a statement about various property rights associated with the resource, including intellectual property rights.
Source	A related resource from which the described resource is derived. The described resource may be derived from the related resource in whole or in part.
Type	The nature or genre of the resource.

### Source, nature and type of contributions

<sup>10</sup> <http://dublincore.org/documents/dces/>

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#	1
Contributor	Temperton
Creator	MacLeod M. G. (Roslin Institute)
Date	2009
Title	Importance of research and development supporting a future UK Role in expanding global poultry industry
Description	Conclusions and recommendations on the importance of research and development for the poultry industry.
Subject	Broilers
Coverage	UK
Format	Printed material
Identifier	ISBN 1 870 955 91 9
Language	English
Publisher	Temperton Fellowship
Relation	-
Rights	Copyrights
Source	Temperton Fellowship Report 17
Type	Report

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#	2
Contributor	Temperton
Creator	Laughlin K. (Aviagen)
Date	2007
Title	The evolution of genetic breeding and productions
Description	The evolution of genetic breeding and productions
Subject	Broiler breeders, broilers
Coverage	N/A
Format	Printed material
Identifier	ISBN 1 870 955 89 7
Language	English
Publisher	Temperton Fellowship
Relation	-
Rights	Copyrights
Source	Temperton Fellowship Report 15
Type	Report

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#	3
Contributor	Individual
Creator	Sorensen P., Kold N. and Andersson M.
Date	1986
Title	Comparative test of mini-hens and normal hens of meat type
Description	Comparative test of mini-hens and normal hens of meat type
Subject	Broiler breeders, mini-hens and normal hens
Coverage	1983; Denmark
Format	Printed material
Identifier	ISSN 0105-6883
Language	Danish (English summary)
Publisher	National Institute of Animal Science, Denmark
Relation	-
Rights	Intellectual property rights
Source	Report from the National Institute of animal science
Type	Report

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#	4
Contributor	Individual
Creator	Petermann S.
Date	2005
Title	Behavioural and physiological responses of three chicken breeds to pre-slaughter shackling and acute heat stress
Description	<p>The aim of this study was to compare the behavioural and physiological responses to hanging and acute heat stress in three different chicken breeds. Chicks were obtained from a slow-growing French 'Label Rouge' line (SGL), a fast-growing standard line (FGL) and a heavy line (HL). The SGL, FGL and HL birds were slaughtered at their respective market ages of 12, 6 and 6 weeks, in an attempt to achieve similar body weights. Before stunning, birds were either shackled by their legs on the moving line for 2 min (shackling stress: SH) or placed in a room at 35 degrees C and 60% of humidity for 3.5 h and then shackled for 2 min ( acute heat stress plus shackling: H+SH) or subjected to minimal stress by shackling for 10 s before stunning ( control group: C). Bird physiological responses to the three pre-slaughter treatments were estimated by measuring blood corticosterone, glycaemia, creatine kinase activity, acid-base status and electrolyte concentration as well as lactate content and glycolytic potential in the breast ( Pectoralis major) and thigh (Ilio tibialis) muscles. Behavioural responses to shackling stress were evaluated by measuring wing flapping duration, straightening up attempts and vocalisations. Blood corticosterone was higher in SH and H+SH groups than in the C group, regardless of genotype. The struggling activity on the shackle line differed among chicken breeds. It was more intense and occurred more rapidly after hanging in the SGL birds than in both other breeds. Furthermore, SGL struggling activity was not affected by hanging duration while it increased with hanging duration in FGL and HL birds. Wing flapping duration was negatively correlated with blood pH, bicarbonate concentration and positively correlated with breast muscle lactate content, indicating that struggling stimulated ante mortem glycolysis activity in breast muscle. Acute heat stress affected blood Ca<sup>2+</sup> and Na<sup>+</sup> concentration and increased glycaemia and glycolytic potential of thigh muscle. 5. Both acute heat stress and shackling before slaughter were experienced as stressful events by all types of birds.</p>
Subject	slow-growing French 'Label Rouge' line (SGL), a fast-growing standard line (FGL) and a heavy line (HL), behaviour, physiology
Coverage	France
Format	Electronic (pdf)
Identifier	ISSN 0007-1668
Language	English
Publisher	Taylor & Francis
Relation	-
Rights	Copyrights
Source	British Poultry Science 46 (5) 527–535
Type	Paper

#	5
Contributor	Individual
Creator	Bureau C., Hennequet-Antier C., Couty M. and Guémené D.
Date	2009
Title	Gene array analysis of adrenal glands in broiler chickens following ACTH treatment
Description	<p>Difference in adaptability responses to stress has been observed amongst bird species, strains, and individuals. Components of the HPA axis, one of the internal systems involved in homeostasis re-establishment following stress, could play a role in this variability of responses. The aim of the present study was 1) to identify genes involved in the regulation of adrenal activity following ACTH stimulation and 2) to examine adrenal genes differentially expressed in individuals with high and low plasma corticosterone response following ACTH treatment. Analysis with 21 K poultry oligo microarrays indicated that ACTH treatment affected the expression of 134 genes. Several transcripts assigned to genes involved in the adrenal ACTH signaling pathway and steroidogenic enzymes were identified as differentially expressed by ACTH treatment. Real-time PCR on 18 selected genes confirmed changes in transcript levels of 11 genes, including MC2R, CREM, Cry, Bmal1, Sqle, Prax1, and StAR. Only 4 genes revealed to be differentially expressed between higher and lower adrenal responders to ACTH treatment. The results from the present study reveal putative candidate genes; their role in regulation of adrenal functions and adaptability to stress should be further investigated.</p>
Subject	Broiler, stress, chicken physiology
Coverage	France
Format	Electronic (pdf)
Identifier	Doi: 1471-2164/10/430
Language	English
Publisher	BioMed Central
Relation	-
Rights	Copyrights
Source	BMC Genomics, 10(1) 430
Type	Paper

#	6
Contributor	Individual
Creator	Hazard D., Couty M., Richard S. and Guémené D.
Date	2008
Title	Intensity and duration of corticosterone response to stressful situations in Japanese quail divergently selected for tonic immobility
Description	<p>Since 1980s, two genotypes of Japanese quail are divergently selected for long (LTI) or short (STI) duration of tonic immobility (Mills and Faure, 1991), an unlearned catatonic state characteristic of a fear behavioral response (Jones, 1986; Mills and Faure, 1991). Results from several behavioral tests, conducted in LTI and STI quail, have led to the conclusion that LTI quail are more fearful than STI (Faure and Mills, 1998). However, up to know, few studies focused on Hypothalamic-Pituitary-Adrenal (HPA) axis response to stressful situations in LTI and STI quail while HPA axis is involved in fear responses (Siegel, 1971). For this reason, corticosterone (CORT) response to various putatively stressful situations was assessed in LTI and STI genotypes of quail in order to investigate their HPA axis reactivity to stress. Repeated induction of TI or 1 minute's manual restraint induced significant and comparable increases in CORT levels in both genotypes as TI response. On the other hand, higher CORT responses were found in STI than in LTI quail when the manual restraint period lasted for 2 min or after restraint in a crush cage. Maximum CORT response and genotype difference were maintained throughout this last test even if it lasted 120 min. Investigation of CORT response to a single TI episode showed that CORT levels at the end of TI were negatively correlated with TI duration. Other different experimental contexts consisting of isolation in a familiar or novel environment, or the presentation of a novel object induced slight but significant and comparable increases in CORT response in both genotypes, whereas change in cagemates did not. In conclusion, present findings indicate that differences in HPA axis response to stressful situations are observed between LTI and STI genotypes, but not systematically, depending upon the nature and/or duration of the stimulus applied. Thus, genetic selection for divergent duration of TI have affected HPA axis response to stress. Therefore LTI and STI quail constitute an interesting model to investigate genetic variability of HPA axis activity in birds. More particularly, these genotypes of quail could be used to investigate the occurrence of functional differences at different levels of the HPA axis in order to explain the present findings.</p>
Subject	Two genotypes of Japanese quail divergently selected for long (LTI) or short (STI) duration of tonic immobility, stress,
Coverage	1980/2008; France
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Elsevier Editorial System(tm)
Relation	-
Rights	Copyrights
Source	General and Comparative Endocrinology 155(2) 288-297
Type	Paper

#	7
Contributor	Individual
Creator	Guémené D., Guy G., Noirault J., Destombes N. and Faure J-M.
Date	2006
Title	Rearing conditions during the force-feeding period in male mule ducks and their impact upon stress and welfare
Description	<p>The aim of the first experiment conducted was to further characterise HPA axis functionality in male mule ducks during the force-feeding period, by measuring corticosterone levels (Exp. 1). The objectives of the two other experiments were to investigate the impact of different rearing conditions on stress response (Exp. 2) and behaviour patterns (Exp. 3) in male mule ducks. The rearing conditions examined comprised individual (Exps. 1–3) and collective battery cages (Exps. 2, 3), as well as collective floor pens (Exps. 2, 3). The ducks were then fed (Exps. 1–3) by force-feeding for foie gras production or ad-libitum (Exp. 1). The highest levels of corticosterone (up to 100 ng·mL<sup>-1</sup>) were measured after initial capture and handling in a large collective rearing pen, transfer to a different environment, initial placement in a net for 10 min and injection of 5 µg·kg<sup>-1</sup> BW of 1-24 ACTH agonist. Both force-fed and non-force fed male mule ducks responded to a first physical constraint in a net by a large increase in corticosterone levels. Their HPA axis was therefore functional although the effect quickly vanished, which was interpreted as an indication that habituation took place. Most often, corticosterone levels measured before and after force-feeding during the force-feeding period did not differ significantly (<math>P &gt; 0.05</math>) when the ducks were raised in individual cages, even on the first occurrence. A significant increase in corticosterone levels was observed after the first force-fed meal for both groups of ducks raised collectively, i.e. in cages or floor pens, when the practice involved capture and handling. Following the injection of 0.625 and 5 µg·kg<sup>-1</sup> BW doses of 1-24 ACTH, cortico-adrenal responses were significantly (<math>P &lt; 0.05</math>) higher and lower for ducks raised in collective floor pens compared to those raised in individual cages, respectively. This hypersensitivity and lower maximal capacity may result from a chronic stressful state related to repeated acute stress (i.e. capture and handling twice daily). Ducks raised in cages (individual or collective) spent more time standing (less lying) and less time inactive i.e. expressing passive behaviour patterns, which suggest that they were not presenting signs of passive coping or learned helplessness. Behaviour observations did not provide any indication of stereotyped behaviour. From these results, it could have been concluded that placement in individual battery cages during the limited period of force-feeding are not detrimental in terms of welfare. However, they cannot achieve full wing stretching or express a full range of social behaviours as required by the European Council recommendation. They may also have more difficulty in thermoregulating as indicated by the fact that they had higher frequencies of both panting and watering. In terms of welfare, since signs of acute and possibly chronic stress were observed when the force-feeding procedure involved capture and handling, there is a need to set up new models of collective cages and better define the optimal group size and density to be used in future rearing conditions.</p>
Subject	Poultry, ducks, stress,
Coverage	France
Format	Electronic (pdf)
Identifier	DOI: 10.1051/animres:2006022
Language	English
Publisher	INRA, EDP Sciences



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Relation	-
Rights	Copyrights
Source	Animal Research 55(5) 443-458
Type	Paper

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#	8
Contributor	Individual
Creator	Guémené D., Debut M., Couty M., Garreau-Mills M., Berri C., Sellier N., Jehl N., Jégo Y., Beaumont C. and Le Bihan-Duval E.
Date	2005
Title	Adrenal responsiveness to stress factors in broilers of fast or slow growing genotypes
Description	<p>The effects of pre-slaughter stress are likely to depend on their specificity, intensity and length, but also, depending upon the genotype and previous experience. The influence of these different factors on the intensity and kinetics of the response, were measured by the changes in corticosterone levels in the plasma of female broilers from a slow (S) and 2 fast (F, Ff [female line] &amp; Fm [male line]) parental lines. The tests were performed at their respective age at slaughter, i.e. 42 (F) and 84 (S) days of age, after being raised in a close barn. Broilers were captured, placed in containers and then submitted to different treatments, exposure at various temperatures (20, 32 or 35°C), or transportation for 2h or 3h30. Their respective maximal adrenal reactivity was measured by injecting i.m a single dose of immediate (IS, Dose 25 µg/animal; genotypes S &amp; F) or delayed (DS, Doses 2.5 or 25 µg/animal; genotype S) Synacthen (1-24 ACTH). Single or multiple blood samples were collected just after capture (T0) and/or at various delays after treatment onset (15, 60, 120, 180, 240, and 360 min) or on the shackle line. Different specific line characteristics were found. The S genotype exhibited lower basal levels and sensitivity to stressors different to that of standard broilers. Maximal levels were reached after 15 min of transportation for Ff broilers whereas they were still low at this time for the S genotype. Transportation induced responses of 30 ng/ml in average, which were comparable to levels obtained after the injection of a high dose of SI or SR. Hanging on the shackle line for a period of 2 min also induced similar levels of corticosterone. Thus, interestingly, these physical treatments induced responses corresponding to maximal reactivity in both genotypes, whereas they induce lower responses in other species (quails, ducks). A room temperature of 35°C increased blood corticosterone to a limited extent (10-15 ng/ml) in the Ff genotype only. In conclusion, these results indicate that high temperature has a limited effect in comparison with transportation or hanging on the shackle line, which are perceived as very intense stress inducing maximal levels of corticosterone. They also show that fast growing broilers respond more quickly to stress, which could suggest a higher sensitivity.</p>
Subject	Broiler, poultry, stress,
Coverage	France
Format	Electronic (pdf)
Identifier	-
Language	French (English summary)
Publisher	Journées de la Recherche Avicole
Relation	-
Rights	Copyrights
Source	Sixièmes Journées de la Recherche Avicole, St Malo, 30 et 31 mars 2005
Type	Paper

#	9
Contributor	Individual
Creator	Mormède P., Andanson S., Aupérin B., Beerda B., Guémené D., Malmkvist J. Manteca X, Manteuffel G., Prunet P., van Reenen C.G., Richard S. and Veissier I.
Date	2007
Title	Exploration of the hypothalamic–pituitary–adrenal function as a tool to evaluate animal welfare
Description	<p>Measuring HPA axis activity is the standard approach to the study of stress and welfare in farm animals. Although the reference technique is the use of blood plasma to measure glucocorticoid hormones (cortisol or corticosterone), several alternative methods such as the measurement of corticosteroids in saliva, urine or faeces have been developed to overcome the stress induced by blood sampling itself. In chronic stress situations, as is frequently the case in studies about farm animal welfare, hormonal secretions are usually unchanged but dynamic testing allows the demonstration of functional changes at several levels of the system, including the sensitization of the adrenal cortex to ACTH and the resistance of the axis to feedback inhibition by corticosteroids (dexamethasone suppression test). Beyond these procedural aspects, the main pitfall in the use of HPA axis activity is in the interpretation of experimental data. The large variability of the system has to be taken into consideration, since corticosteroid hormone secretion is usually pulsatile, follows diurnal and seasonal rhythms, is influenced by feed intake and environmental factors such as temperature and humidity, age and physiological state, just to cite the main sources of variation. The corresponding changes reflect the important role of glucocorticoid hormones in a number of basic physiological processes such as energy metabolism and central nervous system functioning. Furthermore, large differences have been found across species, breeds and individuals, which reflect the contribution of genetic factors and environmental influences, especially during development, in HPA axis functioning. Usually, these results will be integrated with data from behavioral observation, production and pathology records in a comprehensive approach of farm animal welfare.</p>
Subject	farm animals, poultry, HPA axis activity, stress,
Coverage	review
Format	Electronic (pdf)
Identifier	doi:10.1016/j.physbeh.2006.12.003
Language	English
Publisher	Elsevier
Relation	-
Rights	Copyrights
Source	Physiology & Behavior 92(3) 317-339
Type	Paper

#	10
Contributor	Individual
Creator	Kjaer J. and Guémené D.
Date	2009
Title	Adrenal reactivity in lines of domestic fowl selected on feather pecking behaviour
Description	<p>Domestic chicken lines of the White Leghorn layer type differing in their level of feather pecking have been developed by divergent selection specifically on feather pecking behaviour. This paper describes an investigation of basal level, reactivity to manual restraint and maximal adrenal response to 1–24 ACTH in breeder birds of the sixth generation of selection (S6) and their control line. Birds from the three lines had comparable basal levels of corticosterone (1.6 ng/ml, anova F2,101=0.62, ns), whereas males had higher basal levels than females, lsmean 1.9 vs. 1.5 ng/ml (anova F1,103=6.03, Pb0.05). Reactivity to handling and restraint for 10 min differed with HFP birds showing higher reactivity than LFP birds, lsmean 11.0 vs. 7.9 ng/ml (t=-2.00, Pb0.05), while control birds showed intermediate levels (10.2 ng/ml). Males had higher reactivity than females, ls mean 11.2 vs. 8.2 ng/ml (anova F1,103=3.96, Pb0.05). Maximal response did not differ between lines (average 35.7 ng/ml, anova F2,101=1.38, PN0.05). Males had higher maximal response than females, ls mean 41.3 vs. 33.6 ng/ml (anova F1,103=5.77, Pb0.05). The present study shows that selection against feather pecking behavior have resulted in lower levels of feather pecking as well as lower sensitivity to human handling and restraint in White Leghorn laying hen lines. From an animal welfare point of view this is a positive relationship.</p>
Subject	Poultry, White Leghorn layer type , behaviour, feather pecking
Coverage	1995 onwards
Format	Electronic (pdf)
Identifier	doi:10.1016/j.physbeh.2008.10.023
Language	English
Publisher	Elsevier
Relation	-
Rights	Copyrights
Source	Physiology & Behavior 96(2) 370–373
Type	Paper

#	11
Contributor	Individual
Creator	Minozzi G., Guéméné D., Couty M., Gourichon D., Minvielle F. Pinard-van der Laan M. H.
Date	2008
Title	Circulating Corticosterone Reaction to Restraint and Adrenocorticotropin Hormone Administration in White Leghorns Selected for Immune Response Traits
Description	<p>Corticosterone plasma concentration was measured in a random-bred control line and in 3 White Leghorn chicken lines previously selected over 9 generations for 3 different in vivo immune responses: high antibody response to Newcastle disease virus vaccine 3 wk after vaccination (ND3), high cell-mediated immune response (response to phytohemagglutinin, PHA), and high phagocytic activity measured as carbon clearance (CC). The objective of the study was to estimate if selection on immune response had an effect on the response to stress assessed by measures of corticosterone concentration before and after physical stress or adrenocorticotropin hormone injection and if the effect was dependent on the immune response trait that had been selected for, by joint analyses of immune responses and concentrations. The mean values of plasma corticosterone measures did not differ between lines, indicating that selection for different high immune responses had little effect on response to stress. Within line, however, significant negative correlations (<math>-0.46 \leq r \leq -0.39</math>) were found between cell-mediated immunity and corticosterone plasma concentrations in 3 of the 4 lines. Moreover, in the line selected for high antibody titers (ND3-L), corticosterone levels were positively correlated to ND3 (<math>r = 0.41</math> and <math>0.47</math>) and negatively correlated to CC (<math>r = -0.48</math>).</p>
Subject	White Leghorns Selected, chicken, immune response, selection, stress, corticosteronefor, immune response traits, stress , physiology
Coverage	France
Format	Electronic (pdf)
Identifier	Doi: 10.3382/ps.2008-00199
Language	English
Publisher	The Poultry Science Association
Relation	-
Rights	Copyrights
Source	Poultry Science 87(11) 2225-2230
Type	Paper

#	12
Contributor	CiWF
Creator	CiWF
Date	2009
Title	EFSA Call for data on health and welfare aspects of genetic selection in broilers - Response by Compassion in World Farming
Description	Response by Compassion in World Farming to EFSA call for data - review of broiler welfare issues with list of references
Subject	welfare, genetic selection of broilers, management and housing of broiler breeders (i.e. parents and grandparents)
Coverage	N/A
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	CiWF
Relation	-
Rights	Intellectual property rights
Source	CiWF
Type	Statement

#	13
Contributor	AFSSA
Creator	Michel V., Prampart E., Mirabito L., Allain V, Arnould C., Huonnic D., Le Bouquin S., Albaric O.
Date	2009
Title	Standard histologically-validated footpad dermatitis scoring system for use in chicken processing
Description	<p>Broiler chicken feet (n=54) were examined macroscopically and microscopically to determine a reliable correspondence between macroscopic and histological descriptions of footpad lesions and to draw conclusions about lesion-associated pain and its effects on animal welfare. Three types of footpad lesion are defined based on their severity (on histological basis). Type I are mild lesions, visually characterized by scale enlargement and erythema, and histologically, by hyperplasia/hyperkeratosis of the epidermis, superficial dermal congestion and oedema. Type II are moderate, superficial lesions, visually characterized by hypertrophic and hyperkeratotic scales covered with yellowish to brownish exudates, and histologically as more pronounced type I lesions with prominent pustular and crust forming dermatitis. Type III lesions are deep and considered severe. They are visually characterized by a crater-like lesion with loss of substance and a thick dark adherent crust, and histologically by ulceration. A five-point scale based on severity and extend of lesion, i.e. no/mild lesion, type II lesion (&lt;50% or &gt; 50% of footpad) and type III lesion (&lt;50% or &gt; 50% of footpad) was determined, the latter being more severe and likely to induce greater pain. This scoring system, which distinguished lesions on a basis which make sense in term of welfare, is easy to use, reliable and then useful for the routine assessment of broiler chicken welfare in processing plants.</p>
Subject	Broiler chicken, footpad dermatitis scoring system,
Coverage	2008; France
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Veterinary records - submitted
Relation	-
Rights	Copyrights
Source	AFSSA
Type	Paper

#	14
Contributor	Swedish Poultry Meat Association
Creator	Waldenstedt L.
Date	2009
Title	Svensk Fågels Djuromsorgsprogram Rapport 2008 [Swedish Poultry welfare program annual report 2008]
Description	Control of chickens and turkeys feet health has brought a new understanding of the environment in animal housing. It has also meant new investment in the various technical means, which in a benefited the local environment and animal welfare. The combined program has resulted in improved feet health in chicken production. It is important to continuous development of focus on good feet health done with food companies. For turkey side is also a review of the assessment criteria required.
Subject	Broilers, turkey, welfare
Coverage	2008; Sweden
Format	Electronic (pdf)
Identifier	-
Language	Swedish
Publisher	Swedish Poultry Meat Association
Relation	-
Rights	Intellectual property rights
Source	Swedish Poultry Meat Association
Type	Report



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#	15
Contributor	Swedish Poultry Meat Association
Creator	Waldenstedt L.
Date	2007
Title	[Final report of the Board of Agriculture: A survey of movement disorders and leg health status of chickens in Sweden ] Slutrapport Jordbruksverket: En kartläggning av rörelsestörningar och benhälsostatus hos svenska kycklingar
Description	A survey of movement disorders and leg health status of chickens in Sweden
Subject	Broilers, welfare
Coverage	Sweden
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Swedish Board of Agriculture
Relation	-
Rights	Intellectual property rights
Source	SLU, Inst. of Animal Nutrition and Management, Uppsala
Type	Report

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#	16
Contributor	RSPCA
Creator	The Royal Society for the Prevention of Cruelty to Animals (RSPCA)
Date	2006
Title	Everyone's a winner, how rearing chickens to higher welfare standards can benefit the chickens producers retailer
Description	There are four main groups to consider when rearing chickens for meat – the chickens themselves, the producers, the retailers and the customers. This report provides evidence to support the contention that rearing chickens to higher welfare standards can be mutually beneficial to all these groups. The reports present evidence to show that there are clear benefits to all when chickens are reared to higher welfare standards. The responsibility to make improvements to chickens welfare and reap the benefits lies not only with the industry itself but also with those that retail and consume it. The government also bears responsibility, since requirement for strong legislations that makes the necessary changes to improve chickens welfare is evident. thus, we all share a responsibility to ensure our food is produced in way that does not unnecessarily compromise animal welfare
Subject	Broilers, welfare
Coverage	UK
Format	Electronic (pdf)
Identifier	RSPCA
Language	English
Publisher	RSPCA
Relation	-
Rights	Copyrights
Source	RSPCA
Type	Report

#	17
Contributor	RSPCA
Creator	Cooper M., Allanson-Bailey S., Gauthier R., and Wrathall J.
Date	2007
Title	Higher welfare standards and broiler welfare
Description	A UK broiler (meat chicken) producer reared c.2.4 million broilers according to the higher welfare standards of a UK-based animal welfare organisation (RSPCA), and c.10.5 million broilers according to the UK broiler industry's own assurance scheme standards (ACP). RSPCA standards required birds to be slower growing, reared at a lower stocking density, have brighter lit conditions, a longer daily dark period and a more enriched environment. Data relating to four key welfare indicators were collected over a year-long period. RSPCA standards resulted in higher welfare in terms of lower on-farm mortality, a lower proportion of birds with hock and foot pad burn, and a lower proportion of birds arriving dead at the slaughterhouse. Stocking density was positively correlated with the incidence of mortality, hock burns and birds arriving dead at the slaughterhouse.
Subject	Meat producing chickens, welfare
Coverage	2006; UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	-
Relation	-
Rights	Copyrights
Source	WPC Broiler Welfare Article
Type	Paper

#	18
Contributor	RSPCA
Creator	RSPCA
Date	2009
Title	Welfare Indicators
Description	Chicken section summaries numerical data on the number of broilers kept in different production systems in the UK, This report shows the number of chicken reared within the UK over the last 5 years to different welfare standards within different production systems
Subject	Broilers, welfare indicators, different broilers production systems
Coverage	2004 - 2008; UK
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	RSPCA
Relation	-
Rights	Intellectual property rights
Source	RSPCA
Type	Report

#	19
Contributor	RSPCA
Creator	van Middelkoop K., van Harn J., Wiers W. and van Horne P.
Date	2002
Title	Slower growing broilers pose lower welfare risks
Description	Modern broiler production has become the subject of discussions related to bird welfare. High mortality figures as well as increasing health and product quality problems are supporting the worries of many in and outside the industry. Does a slower growing broiler decrease the problem?
Subject	Commercially available, slower growing broiler I 957 (Hubbard/ISA) and the Cobb500, welfare
Coverage	2002
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Elsevier
Relation	-
Rights	Copyrights
Source	World Poultry 18: 20-21
Type	Paper

#	20
Contributor	DEFRA
Creator	Department for Environment, Food and Rural Affairs (DEFRA), UK
Date	2009
Title	DEFRA response for call- Review report
Description	DEFRA welcomes the fact that the EFSA is assessing all the scientific and proprietary information available on the genetics of broilers. DEFRA's review of data and information submitted is set out and includes final reports of DEFRA sponsored research projects, Farm Animal Welfare Council (FAWC) reports, Welfare codes and numerical data on numbers of broilers kept in Great Britain and incidence of infectious diseases.
Subject	Welfare of broilers
Coverage	-
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	DEFRA
Type	Statement

#	21
Contributor	DEFRA
Creator	UK Parliament
Date	2006
Title	Animal Welfare Act
Description	Prevention of harm, Promotion of welfare, Licensing and registration, Codes of practice, Animals in distress, Enforcement powers, Prosecutions, Post-conviction powers. Explanatory Notes have been produced to assist in the understanding of this Act and are available separately.
Subject	Animal Welfare
Coverage	All animals, UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Controller of Her Majesty's Stationery Office and Queen's Printer of Acts of Parliament
Relation	#22
Rights	Crown copyrights
Source	Animal Welfare Act 2006 (c45)
Type	Regulation

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#	22
Contributor	DEFRA
Creator	The Secretary of State
Date	2007
Title	The Welfare of Farmed Animals
Description	In relation to the Animal Welfare Act 2006
Subject	Animal Welfare
Coverage	England
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	The Secretary of State
Relation	#21
Rights	-
Source	The Welfare of Farmed Animals (England) Regulations 2007, No. 2078
Type	Regulation

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#	23
Contributor	DEFRA
Creator	DEFRA
Date	2002
Title	Meat chickens and breeding chickens - code of recommendations for the welfare of livestock
Description	The Code is intended to encourage all those who care for farm animals to adopt the highest standards of husbandry. Without good stockmanship, animal welfare can never be adequately protected. Adherence to these recommendations will help flock-keepers to reach the required standard.
Subject	Broilers, animal welfare
Coverage	UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA Publications
Relation	#21
Rights	Crown copyrights
Source	Code of recommendations for the welfare of livestock
Type	Guidelines

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#	24
Contributor	DEFRA
Creator	Farm Animal Welfare Council (FAWC)
Date	1992
Title	Welfare of Broiler Chickens
Description	Welfare problems and recommendations
Subject	Broilers, welfare
Coverage	UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FAWC
Relation	-
Rights	Intellectual property
Source	FAWC
Type	Report

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#	25
Contributor	DEFRA
Creator	FAWC
Date	2004
Title	Welfare implications of animal breeding and breeding technologies in commercial agriculture
Description	<p>Welfare implications of animal breeding and breeding technologies in commercial agriculture. FAWC recommends that a Standing Committee be established for the evaluation of new and existing breeding technologies as well as for the consideration of welfare and ethical problems arising as a result of livestock breeding programmes. FAWC recommends that the Standing Committee provide advice to Government on the effectiveness of existing legislation, and the possible gaps that exist, relating to farm animal breeding procedures, in order to promote animal welfare. FAWC recommends that the Standing Committee give due consideration to ethical questions associated with animal breeding even where measurable detrimental effects on animal welfare may not be immediately evident. FAWC recommends that any breeding technology, whether developed within the UK or overseas, be thoroughly evaluated by the Standing Committee prior to, and during, its incorporation into commercial agricultural practice in the UK. FAWC recommends that targeted surveillance is made of farms where new breed types or new breeding technologies are first introduced into commercial practice, and that the welfare impact of all such developments is reviewed throughout a period of normally not less than 5 years after introduction into commercial agriculture. In order to determine the consequences of current breeding strategies or any new breeding technology and to provide essential feedback on welfare performance for breed companies, FAWC recommends that a robust surveillance system be established. This should accurately monitor the incidence of specified on-farm welfare problems and be capable of providing information on welfare problems associated with breeding strategies or technologies and to determine the respective genetic and environmental contributions. This surveillance system should include extensive data currently collected, for example, by breed societies and breed companies, and should be developed in association with, and as part of, the Government's Animal Health and Welfare and Veterinary Surveillance Strategies. FAWC recommends that the Government consider methods to close potential loopholes that would allow GM or cloned animals, their gametes or embryos, to enter UK commercial agriculture uncontrolled. FAWC recommends that industry, possibly with Government support, should sponsor research and training programmes for the development of husbandry systems to support the demands of new genotypes in relation to their production system.</p>
Subject	Food producing animal, animal welfare
Coverage	N/A
Format	Electronic (html)
Identifier	-
Language	English
Publisher	FAWC
Relation	-
Rights	Intellectual property
Source	FAWC
Type	Report

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#	26
Contributor	DEFRA
Creator	FAWC
Date	1998
Title	The welfare of broiler breeds
Description	The report summarises FAWC study and makes a number of recommendations
Subject	Broilers, broiler breeders, welfare
Coverage	UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FAWC
Relation	-
Rights	Intellectual property rights
Source	<a href="http://www.fawc.org.uk/reports/pb3907/broiltoc.htm">http://www.fawc.org.uk/reports/pb3907/broiltoc.htm</a>
Type	Report

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#	27
Contributor	DEFRA
Creator	DEFRA
Date	2009
Title	Numerical data on the numbers of broilers by production and housing type in GB.
Description	Broilers by production and housing type in GB.
Subject	Numbers of broilers
Coverage	England
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	DEFRA, RP6615
Type	Data set

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#	28
Contributor	DEFRA
Creator	ADAS Gleadthorpe
Date	1999
Title	The effect of feeding schedules and photoperiods on the predisposition of male broilers to poor leg health
Description	The study examines the effects of feeding schedules in male broilers receiving either a short, moderate or long photoperiod on the incidences and causes of poor leg health, tibia bone biology and the relative accretion of breast muscle mass.
Subject	Broilers, welfare
Coverage	1997-1999, UK
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	#29
Rights	Intellectual property rights
Source	Project AW0215
Type	Report

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#	29
Contributor	DEFRA
Creator	ADAS Gleadthorpe
Date	1999
Title	The effect of feeding schedules and photoperiods on the predisposition of male broilers to poor leg health - tables
Description	The study examines the effects of feeding schedules in male broilers receiving either a short, moderate or long photoperiod on the incidences and causes of poor leg health, tibia bone biology and the relative accretion of breast muscle mass.
Subject	Broilers, welfare
Coverage	1997-1999, UK
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	#28
Rights	Intellectual property rights
Source	Project AW0215
Type	Report

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#	30
Contributor	DEFRA
Creator	University of Bristol
Date	2006
Title	Leg Health and Welfare in Commercial Broiler Production
Description	Research has shown the importance of some specific husbandry practices in determining the expression of leg disorders but, at the start of this project, it was not clear how these practices interacted to determine the overall level of leg disorders in particular flocks.
Subject	Broilers, welfare
Coverage	2003-2006, UK
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	ProjectAW0230
Type	Report



#	31
Contributor	DEFRA
Creator	University of Bristol
Date	2006
Title	Associations between abattoir data and leg health and welfare of chickens
Description	The main objectives of project were: to devise and validate objective scoring systems to record the incidence and severity of contact dermatitis levels and carcass rejection rates at processing plants. To visit and carry out plant assessments for all possible birds from flocks examined as part of project AW 0230. The target was to assess a minimum of 160 of the 225 flocks. To examine associations between stocking density, contact dermatitis and leg health (assessed on farm as part of Project AW 0230). To examine associations between stocking density, rejection data and leg health (assessed on farm as part of Project AW 0230).
Subject	Broilers, welfare
Coverage	2003-2006, UK
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project AW0232
Type	Report

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#	32
Contributor	DEFRA
Creator	Roslin Insitute (Edinburgh)
Date	2000
Title	Food restriction and the welfare of breeding birds
Description	Genetic markers for multiple ovulation in broiler breeders, Welfare of adult broiler breeders
Subject	Welfare of broiler breeders
Coverage	1997-2000, UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project AW1117
Type	Report

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#	33
Contributor	DEFRA
Creator	Roslin Insitute (Edinburgh)
Date	2000
Title	An investigation of bone biology in meat type chickens to enable the development of strategies for prevention and control of lameness
Description	Determine the feasibility of a number of methods for the assessment of bone strength and quality and mineral estimation and establish optimal sites for collection of cortical bone samples. Assessment of methods for the determination of bone formation and bone resorption in the broiler chicken. Set up preliminary broiler study to determine the ideal age of bird sampling to enable planning of experiments with varying dietary calcium (Ca) and phosphorus (P) concentrations. Complete a series of experiments with different dietary Ca and P concentrations and ratios in the starter period of bone growth (0 –2 weeks) and also up to market age (approx. 6 weeks). Determine the effects of differing growth rates and feed restriction on bone quality parameters. Investigate the effect of casein phosphopeptide on Ca and P utilisation and skeletal integrity in broilers.
Subject	Broilers, welfare
Coverage	1997-2000, UK
Format	Electronic (doc) – 4 files
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project AW1118
Type	Report

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#	34
Contributor	DEFRA
Creator	Roslin Insitute (Edinburgh)
Date	2005
Title	Improving the welfare of broiler breeders
Description	Environmental enrichment, feeding high fibre diets, the effects of genotype and a high fibre diet on broiler breeder welfare, the effects of genotype and very high fibre diets on broiler breeder welfare
Subject	Broiler breeders, welfare
Coverage	2002-2005, UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project AW1128
Type	Report

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#	35
Contributor	DEFRA
Creator	Roslin Insitute (Edinburgh)
Date	2001
Title	The investigation of bone and joint pathologies contributing to pain and lameness in meat-type chickens
Description	Bone and joint pathologies contributing to pain and lameness
Subject	Broilers, welfare
Coverage	1997-2001, UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project AW1121
Type	Report

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#	36
Contributor	DEFRA
Creator	Scottish Agricultural College (SAC)
Date	2004
Title	The welfare consequences of the voluntary reduction of food intake by the broiler breeders
Description	The project shows that it is possible to feed broiler breeders ad libitum during rearing and yet achieve target growth and satisfactory performance during lay while abolishing stereotypic object pecking between 6 and 20 weeks of age. To demonstrate possible other welfare consequences of this novel rearing regime requires better methods to characterise animal hunger.
Subject	Broiler breeders, welfare
Coverage	2002-2004, UK
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project AW1130
Type	Report

#	37
Contributor	DEFRA
Creator	Scottish Agricultural College (SAC)
Date	2007
Title	Further development of a method for objective and reliable assessment of broiler leg health under commercial conditions
Description	The purpose of this study was to develop a force plate (FP) system that could be used routinely to objectively assess chicken leg health on commercial production units. The system was validated against post mortem (PM) data, and compared to assessments obtained using the Bristol Gait Scoring method (BGS).
Subject	Broiler welfare
Coverage	2005-2007, UK
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project AW1135
Type	Report

#	38
Contributor	DEFRA
Creator	Roslin Institute
Date	2000
Title	Matching mineral and vitamin composition and supply to the needs of modern poultry genotypes.
Description	The overall objectives of the project were to investigate requirements of modern broilers for a number of vitamins and minerals and other dietary components, to establish the effects of stress upon requirements and to identify mechanisms of action. The vitamins studied were vitamin E, riboflavin, nicotinic acid and vitamin D. The minerals were calcium and phosphorus and carnitine was the other dietary constituent.
Subject	Broiler welfare
Coverage	1997-2000
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project LS0901
Type	Report



#	39
Contributor	DEFRA
Creator	Roslin Institute
Date	2000
Title	Determination of type optimal composition of feed protein for poultry in relation to genotype and stage of growth or production
Description	Determine the “ideal” composition of feed protein for different genotypes and stage of production
Subject	Broiler welfare
Coverage	1997-2000
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project LS0902
Type	Report

#	40
Contributor	DEFRA
Creator	Roslin Institute
Date	2000
Title	Candidate genes for reproductive efficiency in broiler breeders
Description	<p>This project aimed to develop genetic markers to assist the selection of broiler meat type poultry to improve reproductive traits. The parent stock for meat type poultry has relatively poor reproductive performance. Improvements in performance would reduce the inputs required to produce the 800 million broiler chicks placed in the UK per annum. Two approaches were used; Candidate genes are hypothesised to be responsible for a significant proportion of trait variation. We tested alleles of candidate genes for reproductive traits for their effect on the reproductive performance of pedigree broilers. Mapping reproductive genes on the chicken genetic map contributed to the production of comparative genetic maps. The position of these genes and the comparative information they can convey from human and mouse genetic maps will aid the identification of candidate genes in quantitative trait loci studies for reproduction.</p>
Subject	Broiler breeders
Coverage	1997-2000
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project LS2002
Type	Report

#	41
Contributor	DEFRA
Creator	Roslin Institute
Date	2003
Title	Marker assisted selection for improved reproductive performance in broiler breeders
Description	This project aimed to a) identify regions of the chicken chromosome responsible for reproductive traits and b) develop genetic markers to assist in the selection of broiler meat type poultry to improve reproductive traits. Meat type poultry have relatively poor reproductive performance. Any reproductive improvements would reduce the inputs required to produce the 800 million broiler chicks placed in the UK per annum and contribute to the sustainability of this industry. It may also be possible to reduce the dependence on restricted feeding to control reproductive performance with positive benefits for animal welfare.
Subject	Welfare of broiler breeders
Coverage	2000-2003
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project LS3101
Type	Report

#	42
Contributor	DEFRA
Creator	Institute for Animal Health, Compton Laboratory
Date	2000
Title	The genetic basis of innate and immunological resistance to Marek disease virus in chickens
Description	Key objectives were to refine map position of non-MHC genes associated with resistance to Marek's disease (MD); determine the genetic basis of resistance to MD; and investigate innate differences determined by genes for resistance and susceptibility to MD.
Subject	Resistance to diseases
Coverage	1997-2000
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project OD0710
Type	Report

#	43
Contributor	DEFRA
Creator	ADAS Consulting Ltd
Date	2002
Title	Effect of breed suitability, system design and management on welfare and performance of traditional and organic table birds
Description	Project aimed to characterise breed suitability for extensive production (free-range, traditional free-range and organic production) and to assess the contribution of management and system design on bird performance, range usage and animal welfare parameters.
Subject	Production system, organic, free-range
Coverage	1998-2002
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project OF0153
Type	Report

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#	44
Contributor	DEFRA
Creator	Institute for Animal Health, Compton Laboratory
Date	2002
Title	Non-specific and innate resistance to Salmonella infection in chickens and pigs
Description	Cellular basis of resistance to systemic salmonellosis
Subject	Resistance to diseases
Coverage	1999-2002
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	DEFRA
Relation	-
Rights	Intellectual property rights
Source	Project OZ0313
Type	Report

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#	45
Contributor	Wageningen UR Livestock Research
Creator	Rodenburg T.B., van Harn J., van Middelkoop J.H.
Date	2003
Title	Comparison of different light sources
Description	In this experiment four different light sources were compared: high frequent TL with a high light intensity, high frequent TL with a low light intensity (comparable with green/blue light), green/blue light and high pressure sodium light (yellow). The experiment showed that the use of coloured lighting affected welfare, but not production of broilers.
Subject	Broiler welfare
Coverage	Netherlands
Format	Electronic (pdf)
Identifier	ISSN 1570-8624
Language	Dutch (English summary)
Publisher	Animal Sciences Group
Relation	-
Rights	Intellectual property rights
Source	PraktijkRapport Pluimvee 10
Type	Report

#	46
Contributor	Wageningen UR Livestock Research
Creator	Van Harn J. and Veldkamp T.
Date	2007
Title	The use of a mobile feed and drinking system with forced air for broilers
Description	The use of the Ridder ScanFeeder, a mobile feed and drinking system with forced air for broilers, results in a better litter quality and less foot pad dermatitis. However, performance (growth and feed conversion) is less than a traditional equipped broiler house. For implementation of the ScanFeeder system in practice it is necessary that the performance results are better or at least as good as a traditional equipped broiler house.
Subject	Broiler welfare
Coverage	Netherlands
Format	Electronic (pdf)
Identifier	ISSN 1570-8616
Language	Dutch (English summary)
Publisher	Animal Sciences Group
Relation	-
Rights	Intellectual property rights
Source	PraktijkRapport Pluimvee 31
Type	Report



#	47
Contributor	Wageningen UR Livestock Research
Creator	van Harn J. and Ellen H.
Date	2008
Title	Effect of under-floor heating on performance, processing yields, prevalence of foot pad lesions and hock burns
Description	ASG has conducted a broiler study with underfloor heating. Underfloor heating did not affect performance and processing yields, however the prevalence of foot pad lesions and hock burns was reduced.
Subject	Broiler welfare
Coverage	Netherlands
Format	Electronic (pdf)
Identifier	ISSN 1570 - 8616
Language	Dutch (English summary)
Publisher	Animal Sciences Group
Relation	-
Rights	Intellectual property rights
Source	PraktijkRapport Pluimvee 171
Type	Report

#	48
Contributor	Wageningen UR Livestock Research
Creator	van Harn J.
Date	2008
Title	Effect of different light schedules on different broilers strains
Description	Four different light schedules according to EC Directive 2007/43 for broilers were compared. This study was done with five different broilers strains. No interaction was found between light schedule and broiler strain.
Subject	broilers, 5 different strains, e.g.: Cobb 500, Hybro PG+ Hybro G+, Ross 308 and Ross 708, Broiler welfare
Coverage	Netherlands
Format	Electronic (pdf)
Identifier	ISSN 1570 - 8616
Language	Dutch (English summary)
Publisher	Animal Sciences Group
Relation	-
Rights	Intellectual property rights
Source	PraktijkRapport Pluimvee 172
Type	Report

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#	49
Contributor	Wageningen UR Livestock Research
Creator	van Harn J., de Jong I.C., and Veldkamp T.
Date	2009
Title	Effect of bedding material, bedding amount, drip cup and reduced water pressure on broiler performance
Description	Influence of bedding material, bedding amount, drip cup and reduced water pressure on broiler performance
Subject	Broiler welfare
Coverage	Netherlands
Format	Electronic (pdf)
Identifier	ISSN 1570 - 8616
Language	Dutch (English summary)
Publisher	Animal Sciences Group
Relation	-
Rights	Intellectual property rights
Source	PraktijkRapport Pluimvee 220
Type	Report

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#	50
Contributor	Wageningen UR Livestock Research
Creator	Veldkamp T., van Harn J., and van Middelkoop J.H.
Date	2009
Title	Alternatives for AGP's and performance of broilers
Description	The effect of different alternatives for anti microbial growth promoters (AGP's) on performance results has been compared to a positive and negative control. Performance of birds was adversely affected when birds were fed diets without AGP. Alternatives for AGP's, investigated in this study, could not alleviate this negative effect.
Subject	Resistance to diseases
Coverage	Netherlands
Format	Electronic (pdf)
Identifier	ISSN 1570-8624
Language	Dutch (English summary)
Publisher	Animal Sciences Group
Relation	-
Rights	Intellectual property rights
Source	PraktijkRapport Pluimvee 12
Type	Report

#	51
Contributor	VIER PFOTEN
Creator	VIER PFOTEN
Date	2009
Title	Health and welfare aspects of genetic selection in broilers Information and data for the European Food Safety Authority - response VIER PFOTEN review
Description	Production of broilers in the EU and Germany, Structure of production in Germany, German legislation/politics, Animal welfare problems in broilers (Diseases of the organs, Sudden Death Syndrome, Ascites, Skeletal disorders and lameness, Perosis, Tibial Dyschondroplasia, Spondylolisthesis, Dehydration as a result of lameness, Infectious diseases, Contact dermatitis, Changes in Behaviour, Mortality), Animal welfare problems in broiler breeders (parental stock) with references
Subject	broilers, broiler breeders, welfare, genetic selection of broilers, management and housing of broiler breeders (i.e. parents and grandparents)
Coverage	Germany
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	Unpublished
Relation	-
Rights	Intellectual property rights
Source	VIER PFOTEN
Type	Statement

#	52
Contributor	VIER PFOTEN
Creator	Konrad S.
Date	2005
Title	Impact of breeding for rapid growth with fattening chicken on the health - project report [Auswirkungen der Zucht auf schnelles Wachstum bei Masthühnern auf die Tiergesundheit]
Description	Impact of breeding broiler chicken for rapid growth broiler on the health - project report
Subject	Broilers, rapid growth, health
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	German
Publisher	VIER PFOTEN
Relation	-
Rights	Intellectual property rights
Source	VIER PFOTEN
Type	Report

#	53
Contributor	VIER PFOTEN
Creator	Petermann S.
Date	2004
Title	A study of foot health in broilers – Perspective of practical assessment [Untersuchungen Zur Sohlenbeschaffenheit Von Broilern – Perspektiven Der Praktischen Bewertung]
Description	<p>Within a study of broiler fattening at the Research Farm Ruthe, School of Veterinary Medicine Hannover, the foot-health of two flocks, one in February and one in April 2002, was examined. In each fattening period nearly one fourth of the flock was sent to the abattoir with 31 respectively 32 days of age. The rest of the flock left the farm one week later. From each slaughtered section broiler feet were sampled and the footpad status was macroscopically classified together by three investigators. The foot pad lesions were assigned to one of 4 classes: 1 = no changes (completely intact foot and toe pad, no discolouration); 2 = minor changes (slight hyperkeratosis, small parts of the footpad discoloured to light brown); 3 = moderate changes (larger or multiple tumours, i.e. parts of the footpad and/or toe-pad discoloured to dark brown, superficial lesions); 4 = severe changes (deeper and larger lesions, necroses and large ulcerations covered with dark brown scabby substrate that can be partially removed). The macroscopically findings were compared by histological examinations (exemplary for each class). The results show, as in Swedish studies (BERG 1998; ALGERS und BERG 2001), that the foot-health of broilers can be improved by better ventilation in combination with heating and litter management. Because there are considerations to establish foot health as an indicator for the allowed stocking density of broilers in the EU, Lower Saxony decided to put on a pilot project for one year to survey the point prevalence of footpad dermatitis at time of slaughter. The aim of this study is to make progress in the „Lower Saxony Broiler Agreement“ by using objective indicators for a good husbandry practice</p>
Subject	Broiler, foot health, assessment
Coverage	2002
Format	Electronic (pdf)
Identifier	Nürtinger DVG-Tagung, 19.-20.02.2004, Tag.band 16 – 24
Language	German (English summary)
Publisher	Nürtinger DVG-Tagung
Relation	-
Rights	Intellectual property rights
Source	Nürtinger DVG-Tagung, 19.-20.02.2004, Tag.band 16 – 24
Type	Paper

#	54
Contributor	VIER PFOTEN
Creator	Knowles T.G, Kestin S.C., Haslam S.M., Brown S.N., Green L.N., Butterworth A., Pope S.J, Pfeiffer D.,Nico C.J.
Date	2008
Title	Leg disorders in broiler chickens: prevalence, risk factors and prevention
Description	<p>Broiler (meat) chickens have been subjected to intense genetic selection. In the past 50 years, broiler growth rates have increased by over 300% (from 25 g per day to 100 g per day). There is growing societal concern that many broiler chickens have impaired locomotion or are even unable to walk. Here we present the results of a comprehensive survey of commercial flocks which quantifies the risk factors for poor locomotion in broiler chickens. We assessed the walking ability of 51,000 birds, representing 4.8 million birds within 176 flocks. We also obtained information on approximately 150 different management factors associated with each flock. At a mean age of 40 days, over 27.6% of birds in our study showed poor locomotion and 3.3% were almost unable to walk. The high prevalence of poor locomotion occurred despite culling policies designed to remove severely lame birds from flocks. We show that the primary risk factors associated with impaired locomotion and poor leg health are those specifically associated with rate of growth. Factors significantly associated with high gait score included the age of the bird (older birds), visit (second visit to same flock), bird genotype, not feeding whole wheat, a shorter dark period during the day, higher stocking density at the time of assessment, no use of antibiotic, and the use of intact feed pellets. The welfare implications are profound. Worldwide approximately 261010 broilers are reared within similar husbandry systems. We identify a range of management factors that could be altered to reduce leg health problems, but implementation of these changes would be likely to reduce growth rate and production. A debate on the sustainability of current practice in the production of this important food source is required</p>
Subject	Broiler chickens, commercial flocks, leg disorders, prevalence, risk factors, prevention
Coverage	2003-2006, UK
Format	Electronic (pdf)
Identifier	doi:10.1371/journal.pone.0001545
Language	English
Publisher	PLoS ONE
Relation	-
Rights	Creative Commons Attribution License
Source	PLoS ONE 3(2): e1545.
Type	Paper



#	55
Contributor	VIER PFOTEN
Creator	Wolf-Reuter M.
Date	2004
Title	Evaluation of different intensive production systems of broilers under consideration of process and product quality [Bewertung unterschiedlich intensiver Produktionssysteme von Masthähnchen unter Berücksichtigung von Prozess- und Produktqualität]
Description	The model study aimed to assess broiler production systems relative to process quality, animal health and animal welfare as well as to product quality and product hygiene. five farms each of intensive indoor broiler production, free range production (EU-VO 1538/91) and organic production (EU-VO 1804/99) were examined during a total of 30 production periods (15 summer, 15 winter). The evaluation included microbiological parameters (total bacterial counts of the air, water and barn facilities, the occurrence of salmonellae and parasites (coccidae) as well as indications of animal health such as foot pad quality, walking ability, feathering condition, dirtiness of skin and injuries. Product quality assessment involved carcass composition and meat quality (including a consumer panel test).
Subject	broilers, intensive indoor, free range, organic, microbiological parameters, animal health, animal welfare, meat quality, carcass composition
Coverage	Germany
Format	Electronic (pdf)
Identifier	-
Language	German (English summary)
Publisher	Tierärztliche Hochschule Hannover
Relation	-
Rights	Intellectual property rights
Source	Bundesforschungsanstalt für Landwirtschaft (FAL)
Type	PhD thesis

#	56
Contributor	VIER PFOTEN
Creator	Boelling D, Groen A.F., Sørensen P., Madsen P., Jensen J.
Date	2003
Title	Genetic improvement of livestock for organic farming systems
Description	<p>Organic farming which experienced a constant rise over the last two decades is a system based on sustainability and on a concept tending towards functional integrity. Legislation as well as the wish to produce separately from conventional farming raise the question whether organic farming should be conducted completely apart from conventional farming or not. This paper discusses the aspects that affect animal breeding under these circumstances, e.g., maintaining genetic diversity by using local breeds and possible G3E interactions which might occur when breeds adapted to conventional farming systems are used in organic farming. Ways of modelling G3E are presented, moreover examples of G3E in dairy cattle, swine, and poultry are given. Trends in selection index theory—designing multi-trait breeding goals including functional traits on one hand, and developing methods for using customised selection indices on the other hand—support breeding work for organic farming systems. It is concluded that before the technical issues can be addressed, all parties involved, farmers, consumers as well as legislators, have to agree on the socio-cultural conditions under which organic farming should be conducted.</p>
Subject	Organic farming; G3E interaction; Reaction norm curves; Animal breeding
Coverage	Review
Format	Electronic (pdf)
Identifier	doi:10.1016 /S0301-6226(02)00323-8
Language	English
Publisher	Elsevier
Relation	-
Rights	Copyrights
Source	Livestock Production Science 80 (2003) 79–88
Type	Paper

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#	57
Contributor	VIER PFOTEN
Creator	Hubart
Date	2007
Title	Management Guide Broiler Hubbard
Description	Management Guide Broiler Hubbard
Subject	Broiler, management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Hubart
Relation	-
Rights	Copyrights
Source	Hubart
Type	Guidelines

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#	58
Contributor	VIER PFOTEN
Creator	Reiter K, Bessei W
Date	2009
Title	Effect of locomotor activity on leg disorder in fattening
Description	<p>eg disorders have become a major concern in commercial poultry meat production. The mechanisms which cause leg problems are not completely understood. It has been hypothesed that high growth rate and low locomotor activity are the main factors. The particular effects of the different factors have been elucidated in special experiments. The locomotor activity of broilers with different growth rates has been observed in deep litter compartments with videotracking technique. The effects of locomotor activity were analysed through a training on treadmills in slow and fast growing broilers. Fast growing broilers showed a lower activity level from week one onwards and there was a pronounced drop in walking distances in the third week of age (21 to 8 meters per hour), while the slow growing broilers maintained a high activity level from 36 m throughout the fattening period. Systematic training of fast growing birds on treadmills increased the locomotion ability, the bone density and thickness and reduced the bending and twisting in leg bones. Increasing the distance between feeders and drinkers may be a method to increase locomotor activity under practical conditions and may be a method to reduce the incidence of leg disorders. Based on the results of previous experiments, a final test was carried out placing the feeder and drinker at two varied distances apart from each other (2 and 12 meters) and monitoring the effects on growth rate, locomotor activity, bone development and leg weakness in broilers. A total of 4800 male and female broilers (in groups of 600) were tested under virtually real conditions. The larger distance between food and water led to a three times increased level of locomotor activity. Weight development and food utilisation were not negatively influenced. Groups of birds, whose food and water supply were placed 12 metres apart, had significantly less cases of leg weakness and deaths due to leg disorders (2%). Increased walking activated the bone building processes of the tibia. This method is a practical way for broiler farmers to decrease leg weakness.</p>
Subject	Broiler, locomotor activity, leg disorders
Coverage	broiler
Format	Electronic (pdf)
Identifier	DOI: 10.2376/0005-9366-122-264
Language	English/German
Publisher	Berl Munch Tierarztl Wochenschr
Relation	-
Rights	Copyright
Source	Berl Munch Tierarztl Wochenschr
Type	Paper

#	59
Contributor	ITAVI - L'UMT BIRD
Creator	Institut Technique de l'AViculture ITAVI - L'UMT BIRD
Date	2009
Title	Untilled data set
Description	Broilers body live weight and the lesions (pod dermatitis, breast burns, hock burn) data collected in the slaughter process. Data collected in 2009 from the week 23 until the week 41 in a big broiler company in France. Some elements of protocol are described on the first page. It compiles data about lesions in regard with strains of broilers. Strains are codified but the same code is always given for the same strain.
Subject	broilers standard
Coverage	2009 / FR
Format	Electronic (xls)
Identifier	-
Language	English
Publisher	-
Relation	-
Rights	Intellectual property rights
Source	ITAVI - L'UMT BIRD
Type	Data set

#	60
Contributor	Ministry of Agriculture and Forestry- New Zealand
Creator	Bagshaw C. S. , Matthews L. R., Rogers A.
Date	2006
Title	Key indicators of poultry welfare in New Zealand
Description	<p>There is currently a high level of interest by policy/regulatory authorities, the public, welfare organisations, growers and lobby groups in the welfare of poultry kept for meat production. Thus, there is an urgent need to identify key welfare indicators relevant to New Zealand conditions, use these measures to assess the welfare status of broilers under common farming practices, and, where necessary, revise practices in industry, and standards and recommendations in the relevant welfare codes. At the beginning of the study, a Broiler Welfare Research Committee (BWRC) was formed (with representation from Poultry Industry Association of New Zealand (PIANZ), poultry veterinarians and representatives from the major meat chicken companies in New Zealand, a scientist from AgResearch and an independent scientist to oversee the research programme. The aim of the research was to identify appropriate welfare indicators for broilers, and apply them to quantify the welfare status of broilers in New Zealand. This study used a suite of measures to assess welfare including: the incidence (and causes) of mortalities and culls; skin disorders of the feet, hocks and breasts; gait score; and the incidence of back scratches, birds dead on arrival (DOA), rejects. The potential influence of management factors on welfare was examined through information collected in a grower survey. The potential influence of stocking density was examined by correlating welfare measures with variations in stocking density that arose naturally during the study. The research was carried out on 36 New Zealand housed commercial broiler farms in each of the four seasons and within the context of the typical management of the birds. There were few differences in husbandry practices between farms. Overall mortality was 3.8%, which is at the lower end of levels typically seen in the industry overseas. Of all the birds in the study, 0.3% died as leg culls. The contribution of leg culls to total mortality was relatively low (8%) and about half that reported for birds in two recent UK studies (15%). The proportion of birds with severe leg weakness (gait score 4 (0.78%) and 5 (0.1%)) was about one quarter that reported for broilers in the UK, Denmark and Sweden. Considering both the leg culling and gait scoring information together, our results demonstrate that leg health in New Zealand broilers is better than for birds in Europe. Prevalence of all forms of contact dermatitis (footpad, hock burn and breast blisters) was within the range reported internationally. Incidences, such as occurred, were mostly of a relatively minor nature. These data indicate that the litter in the houses is maintained in good condition, although there were seasonal variations. Pre-slaughter handling procedures, as assessed by Dead On Arrivals and reject birds, were generally better than reported for other countries. The proportion of birds with back scratches averaged 39%. Meaningful comparisons between our data and the incidence of scratches reported elsewhere were not possible due to the lack details of the measurement criteria provided in other published reports. Stocking density varied between 32.9 and 39.3 kg m<sup>-2</sup>. Stocking density was not correlated with any of the welfare measures, or variables in the epidemiological survey, suggesting that broiler welfare is either unaffected by stocking density, or that the range in densities seen in the current study was too small to enable correlations to be detectable. Stocking density (at the levels currently used in this study) would appear appropriate as the welfare of the birds is good. The welfare of broilers in New Zealand is equal to or superior to that of broilers kept elsewhere.</p>

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Subject	Broilers, welfare, indicators
Coverage	New Zealand
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	The Ministry of Agriculture and Forestry
Relation	-
Rights	Intellectual property rights
Source	The Ministry of Agriculture and Forestry
Type	Report

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#	61
Contributor	EFFAB/EPB
Creator	Malafosse A. et al.
Date	2009
Title	EADGENE (European Animal Disease Genomics Network of Excellence for Animal Health and Food Safety) project presentation - Animal Health Data Comparison
Description	EADGENE (European Animal Disease Genomics Network of Excellence for Animal Health and Food Safety) project presentation - Animal Health Data Comparison
Subject	Farm animals, animal health data
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EADGENE
Relation	-
Rights	Intellectual property rights
Source	EADGENE
Type	Paper - poster



#	62
Contributor	EFFAB/EPB
Creator	EADGENE
Date	2009
Title	EADGENE project - Minutes Data Comparison workshop 25th May Brussels
Description	Minutes of EADGENE workshop aimed to exchange about the needs and possibilities of animal health data gathering and comparison by the relevant stakeholders as a bottom up process. What are the needs and possibilities concerning the availability, possible interoperability and comparability of animal health data in various sectors? What are the possibilities and feasibility – in pig, cattle and poultry, on non notifiable diseases? Three working groups of stakeholders have defined the need, feasibility and gaps. The poultry working group will investigate the interoperability at the international level (between the represented European countries).
Subject	Farm animals, animal health data
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EADGENE
Relation	-
Rights	Intellectual property rights
Source	EADGENE
Type	Report

#	63
Contributor	EFFAB/EPB
Creator	EADGENE
Date	2009
Title	EADGENE project - EADGENE Data Comparison Animal Health Data Phase 2 November 2008 – February 2010
Description	EADGENE (European Animal Disease Genomics Network of Excellence for Animal Health and Food Safety) 2nd phase of project presentation - Animal Health Data Comparison
Subject	Farm animals, animal health data
Coverage	Farm animals
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EADGENE
Relation	-
Rights	Intellectual property rights
Source	EADGENE
Type	Paper -poster

#	64
Contributor	EFFAB/EPB
Creator	Malafosse A., van der Sanden A., Jones G., Jones H, Hoste S.,
Date	2008
Title	Project Report EADGENE conference presentation Data Comparison October 2008
Description	<p>The impact of epidemic livestock diseases is devastating on farmers and economy. The current project, a subproject of the EU funded Network of Excellence EADGENE, was a pilot study to provide an overview on animal health data recording in France, United Kingdom, Netherlands, Denmark. This could help to assess the feasibility for harmonisation and increased collaboration in EU animal health data collection, which would be a major step in achieving the overall goal of the new EU Animal Health Strategy 2007-2013. Primary information on the national structures in animal health data collection has been gathered through interviews and discussions with representatives of government departments, government agencies, academics, animal scientists, veterinarians and industry organisations within each country. Based on the acquired information, schematic overviews per country have been built for cattle, pigs and poultry. Animal health data collection is strongly shaped by the national historical scale and organisation of animal production for each species, and by national and EU regulations. Most animal health databases have not been designed to exchange data nor for accessibility for a variety of stakeholders. Data availability aimed to meet requirements of official bodies is limited. Potentially a lot of information could be available from what is being collected through e.g. animal breeding and milk recording companies. Animal health schemes and levy boards provide incentives for greater harmonisation and transparency of what is being collected on a commercial level on farms and in abattoirs. The various European food chain stakeholders are increasingly aware of the need for harmonised and accessible animal health data. This pilot gives an indication for opportunities and feasibility of greater harmonisation and transparency in animal health data collection across EU countries. In the next, currently running phase stakeholder groups such as commercial vets, breeders, animal health organisations, farmers' organisations, researchers, will be targeted to further define the possibilities for cross-national animal health data exchange/networks and comparability.</p>
Subject	Farm animals, animal health data
Coverage	farm animals
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	EADGENE
Relation	-
Rights	Intellectual property rights
Source	EADGENE
Type	Report

#	65
Contributor	DELETED
Creator	EFFAB
Date	2009
Title	Evolution of Broiler Performance in France per Category
Description	EFFAB - Evolution of Broiler Performance in France per Category. Survey is being made by the French Agricultural Chambers each year since the early 80's. Farmers are participating to the survey on a voluntary basis. The data are taken from the farmers accounting books (1987 - 2008)
Subject	Broilers
Coverage	1987 – 2008, France
Format	Electronic (xls)
Identifier	-
Language	EN
Publisher	EFFAB
Relation	-
Rights	Intellectual property rights
Source	EFFAB
Type	Data set

#	66
Contributor	EFFAB/EPB
Creator	Malafosse A., van der Sanden A., Jones G., Jones H, Hoste S.,
Date	2008
Title	Project Report EADGENE Data Comparison October 2008
Description	<p>The impact of epidemic livestock diseases can be devastating on farmers and the economy as a whole – in a specific country, a continent or even globally. The new Animal Health Strategy 2007-2013 for the European Union (EU) is striving for increased collaboration between EU member states to increase the prevention of animal health related problems before they happen and to be ready to manage outbreaks and crisis more effectively. The strategy builds on the current animal health legal framework in the EU and recognises the need for replacing the existing series of linked policy actions by a single regulatory framework with an incentive-orientated approach and an appropriate sharing of costs and responsibilities. For plans to gradually develop an EU interoperational scheme feasibility studies are necessary before concrete proposals can be made. Animal movement and health data is a key source of information in the effective management of disease prevention and outbreaks. The feasibility of making the collection of animal health data interoperational within the EU is therefore of great interest. The current project was a pilot study to provide an overview on animal health data recording in four EU member countries. This could help to assess the feasibility for interoperability and increased collaboration in the collection of animal health data in the EU, which would be a major step in achieving the overall goal of the new EU animal health strategy. The methodology of this study in itself is a potential catalyst to increased sharing of relevant knowledge and collaboration between countries.</p>
Subject	Animal Health Data
Coverage	EADGENE
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EADGENE
Relation	#67
Rights	Intellectual property rights
Source	EADGENE
Type	Report

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#	67
Contributor	EFFAB/EPB
Creator	Malafosse A., van der Sanden A., Jones G., Jones H., Hoste S., Aumuller R., Oostenbach P.J.G, Rehben E., Neeteson A.M.A., Neuteboom M.
Date	2008
Title	Project Report EADGENE Data Comparison October 2008- diagrams
Description	Project Report EADGENE Data Comparison October 2008- diagrams
Subject	Farm animals, animal health data
Coverage	EU
Format	Electronic (ppt)
Identifier	-
Language	English
Publisher	EADGENE
Relation	#66
Rights	Intellectual property rights
Source	EADGENE
Type	Report

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#	68
Contributor	FAWC-UK
Creator	FAWC
Date	1998
Title	FAWC Broiler Breeder Report
Description	Farm Animal Welfare Council - Report on the welfare of broiler breeds
Subject	Broiler breeders welfare
Coverage	N/A
Format	Electronic (htm)
Identifier	-
Language	English
Publisher	FAWC
Relation	-
Rights	Copyrights
Source	FAWC
Type	Report

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#	69
Contributor	FAWC-UK
Creator	FAWC
Date	2004
Title	FAWC Report on the Welfare Implications of Animal Breeding and Breeding Technologies in Commercial Agriculture
Description	Farm Animal Welfare Council: report on the welfare implications of animal breeding and breeding technologies in commercial agriculture. This report covers the Council's views on the welfare implications of animal breeding and breeding technologies in commercial agriculture. It makes a number of recommendations that are applicable to all.
Subject	Farm animal, breeding
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FAWC
Relation	-
Rights	Copyrights
Source	FAWC
Type	Report



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#	70
Contributor	FAWC-UK
Creator	FAWC
Date	2005
Title	Proposal for a council directive on the welfare of chickens kept for meat production
Description	FAWC comments for proposal council directive on the welfare of chickens kept for meat production, addressing issues of stocking density, mortality and culls, lighting and welfare outcomes
Subject	Chickens kept for meat production, welfare
Coverage	EU
Format	Electronic (htm)
Identifier	-
Language	English
Publisher	FAWC
Relation	-
Rights	Copyrights
Source	FAWC
Type	Statement

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#	71
Contributor	FAWC-UK
Creator	FAWC
Date	2009
Title	Consultation on New Regulations and Code for Meat Chicken Welfare
Description	FAWC comments on legislative changes by Directive 2007/43/EC and Code of Recommendations for the Welfare of Livestock: Meat Chickens and Breeding Chickens in England.
Subject	chickens kept for meat production, welfare
Coverage	England
Format	Electronic (htm)
Identifier	-
Language	English
Publisher	FAWC
Relation	-
Rights	Copyrights
Source	FAWC
Type	Statement

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#	72
Contributor	FAWC-UK
Creator	FAWC
Date	2008
Title	Opinion on Beak Trimming of Laying Hens
Description	FAWC opinion on beak trimming of laying hens
Subject	beak trimming, laying hens
Coverage	UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FAWC
Relation	#73
Rights	Copyrights
Source	FAWC
Type	Report

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#	73
Contributor	FAWC-UK
Creator	FAWC
Date	2007
Title	Beak trimming of laying hens
Description	FAWC letter to DEFRA in regards to beak trimming of laying hens regulation
Subject	beak trimming, laying hens
Coverage	UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FAWC
Relation	#72
Rights	Copyrights
Source	FAWC
Type	Statement

---

#	74
Contributor	FAWC-UK
Creator	FAWC
Date	2009
Title	Report on the Welfare of Farmed Animals at Slaughter or Killing Part 2: White Meat Animals
Description	FAWC report dealing with the Welfare of Farmed Animals at Slaughter or Killing. This Report deals specifically with animals with white meat, namely meat chickens (broilers), laying hens, turkeys, ducks, geese, gamebirds and rabbits.
Subject	Welfare, stunning, killing, meat chickens (broilers), laying hens, turkeys, ducks, geese, game birds and rabbits.
Coverage	UK
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FAWC
Relation	-
Rights	Copyrights
Source	FAWC
Type	Report

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#	75
Contributor	FAWC-UK
Creator	FAWC
Date	2006
Title	Finnish proposals for the meat chicken Directive
Description	FAWC statement about Finnish presidency proposals for the meat chicken Directive
Subject	Welfare, broilers,
Coverage	EU
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	FAWC
Relation	#76
Rights	Intellectual property rights
Source	FAWC
Type	Statement

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#	76
Contributor	FAWC-UK
Creator	FAWC
Date	2006
Title	FAWC rapid response to DEFRA on proposed amendments to the draft broiler directive
Description	FAWC rapid response to DEFRA on proposed amendments to the draft broiler directive
Subject	Welfare, broilers
Coverage	EU
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	FAWC
Relation	#75
Rights	Intellectual property rights
Source	FAWC
Type	Statement

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#	77
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2009
Title	Hubbard Flex Parent Performance Summary
Description	Hubbard Flex Parent Performance Summary
Subject	Hubbard Flex Parent Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	78
Contributor	EFFAB/EPB
Creator	Hubbard
Date	-
Title	Hubbard F15 Parent Management Guide
Description	Hubbard F15 Parent Management Guide
Subject	Hubbard F15 Parent Management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	79
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2009
Title	Hubbard F15 Parent Performance Summary
Description	Hubbard F15 Parent Performance Summary
Subject	Hubbard F15 Parent Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	80
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2007
Title	Hubbard Flex Broiler Performance Summary
Description	Hubbard Flex Broiler Performance Summary
Subject	Hubbard Flex Broiler Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	81
Contributor	EFFAB/EPB
Creator	Hubbard
Date	-
Title	Hubbard Flex Parent Management Guide
Description	Hubbard Flex Parent Management Guide
Subject	Hubbard Flex Parent Management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	82
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2009
Title	Hubbard Yield Parent Performance Summary
Description	Hubbard Yield Parent Performance Summary
Subject	Hubbard Flex Parent Management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	83
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2007
Title	Hubbard JV Broiler Performance Summary
Description	Hubbard JV Broiler Performance Summary
Subject	Hubbard JV Broiler Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	84
Contributor	EFFAB/EPB
Creator	Hubbard
Date	-
Title	Hubbard JV Parent Management Guide
Description	Hubbard JV Parent Management Guide
Subject	Hubbard JV Parent Management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	85
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2009
Title	Hubbard JV Parent Performance Summary
Description	Hubbard JV Parent Performance Summary
Subject	Hubbard JV Parent Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	86
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2009
Title	Hubbard Yield Broiler Performance Summary
Description	Hubbard Yield Broiler Performance Summary
Subject	Hubbard Yield Broiler Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	87
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2007
Title	Hubbard F15 Broiler Performance Summary
Description	Hubbard F15 Broiler Performance Summary
Subject	Hubbard F15 Broiler Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	88
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2005
Title	Hubbard Color Conventional RedbroS Performance Summary
Description	Hubbard Color Conventional RedbroS Performance Summary
Subject	Hubbard Color Conventional RedbroS Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	89
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2009
Title	Hubbard Color Mini JA57 Parent Performance Summary
Description	Hubbard Color Mini JA57 Parent Performance Summary
Subject	Hubbard Color Mini JA57 Parent
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	90
Contributor	EFFAB/EPB
Creator	Hubbard
Date	-
Title	Hubbard Color Mini Parent Management Guide
Description	Hubbard Color Mini Parent Management Guide
Subject	Hubbard Color Mini Parent Managem
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	91
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2005
Title	Hubbard Color Mini RedbroM Performance Summary
Description	Hubbard Color Mini RedbroM Performance Summary
Subject	Hubbard Color Mini RedbroM
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	92
Contributor	EFFAB/EPB
Creator	Hubbard
Date	-
Title	Hubbard Color Conventional Parent Management Guide
Description	Hubbard Color Conventional Parent Management Guide
Subject	Hubbard Color Conventional Parent Management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	93
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2007
Title	Hubbard Broiler Management Guide
Description	Hubbard Broiler Management Guide
Subject	Hubbard Broiler Management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	94
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2007
Title	Hubbard Classic Broiler Performance Summary
Description	Hubbard Classic Broiler Performance Summary
Subject	Hubbard Classic Broiler Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	95
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2009
Title	Hubbard Classic Parent Management Guide
Description	Hubbard Classic Parent Management Guide
Subject	Hubbard Classic Parent Management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	96
Contributor	EFFAB/EPB
Creator	Hubbard
Date	2006
Title	Hubbard Classic Parent Performance Summary
Description	Hubbard Classic Parent Performance Summary
Subject	Hubbard Classic Parent Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English/French/Spanish
Publisher	Hubbard
Relation	-
Rights	Copyrights
Source	Hubbard
Type	Guidelines

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#	97
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	Intro to Agristats
Description	Short description of source and data collection of provided data set from Argistat
Subject	broiler performance data USA
Coverage	1988-2008, USA
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	-
Relation	#98
Rights	Intellectual property rights
Source	EFFAB/EPB
Type	Statement

---

#	98
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	Agristats data
Description	USA data on broilers performance (Liveability and Weight, Liveability and Breast Meat Yield, Weight and Field condemnations, Weight and Carcass Yield , Calories to 2.2k)
Subject	Broiler performance data USA
Coverage	1988-2008, USA
Format	Electronic (xls)
Identifier	-
Language	English
Publisher	Agristats
Relation	#97
Rights	Copyrights
Source	Agristats
Type	Data set

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#	99
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	Intro to Canadian data
Description	Short description of source of data on condemnation in Canadian poultry slaughter houses
Subject	broiler chickens, slaughterhouse condemnation
Coverage	1999-2009, Canada
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	-
Relation	#100
Rights	Intellectual property rights
Source	EFFAB/EPB
Type	Statement

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#	100
Contributor	EFFAB/EPB
Creator	Agriculture and Agri-Food Canada
Date	2009
Title	Information Bulletins on Poultry Condemnations in Canada 1996-2009
Description	Information Bulletins on Condemnations in Canada: Poultry Condemnation Report by Species. Report displays poultry condemnations for selected species (chickens and turkey) for a selected month or year (1999-2009).
Subject	broiler chickens, slaughterhouse condemnation
Coverage	1999-2009, Canada
Format	Electronic (xls)
Identifier	-
Language	English / French
Publisher	Agriculture and Agri-Food Canada
Relation	#99
Rights	Copyrights
Source	Agriculture and Agri-Food Canada
Type	Data set

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#	101
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	Intro to Dutch data
Description	Short description of source and data collection of provided Netherlands data set
Subject	broiler farm data
Coverage	1986 - 2007, Netherlands
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	-
Relation	#102
Rights	Intellectual property rights
Source	EFFAB/EPB
Type	Statement

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#	102
Contributor	EFFAB/EPB
Creator	LEI Wageningen University and Research center
Date	2009
Title	Dutch data table 82c broilers Netherlands 1986-2007
Description	Poultry farm data - broilers (Netherlands 1986-2007)
Subject	broiler farm data
Coverage	1986 - 2007, Netherlands
Format	Electronic (xls)
Identifier	-
Language	English
Publisher	-
Relation	#101
Rights	Copyrights
Source	LEI Wageningen
Type	Data set

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#	103
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	Intro to French data
Description	Short description of source and data collection of provided French data set
Subject	Broiler farm data
Coverage	1982-2008, France
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	-
Relation	#104
Rights	Intellectual property rights
Source	EFFAB/EPB
Type	Statement

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#	104
Contributor	EFFAB/EPB
Creator	French Agricultural Chambers
Date	2009
Title	Evolution of Broiler Performance in France per Category
Description	Broiler performance data form France
Subject	Broiler farm data
Coverage	1982-2008, France
Format	Electronic (xls)
Identifier	-
Language	English
Publisher	-
Relation	#103
Rights	Copyrights
Source	French Agricultural Chambers
Type	Data set

#	105
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	Intro to German data
Description	Short description of source and data collection of provideded German data set
Subject	broiler farm data
Coverage	2000-2009, Germany
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	-
Relation	#106
Rights	Intellectual property rights
Source	EFFAB/EPB
Type	Statement

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#	106
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	German figures
Description	Broiler performance data from Germany
Subject	Broiler farm data
Coverage	2000-2009, Germany
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	-
Relation	#105
Rights	Copyrights
Source	EFFAB/EPB
Type	Data set

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#	107
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	Submission European Forum of Farm Animal Breeders and European Poultry Breeders to EFSA Call for Data EFSA/DATEX/031 of 9 July 2009 - Health and welfare aspects of genetic selection in broilers
Description	Submission European Forum of Farm Animal Breeders and European Poultry Breeders to EFSA Call for Data EFSA/DATEX/031 of 9 July 2009 “Health and welfare aspects of genetic selection in broilers” letter.
Subject	Welfare, health, genetic selection, broilers, broiler breeders
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EFFAB/EPB
Relation	-
Rights	Confidential
Source	EFFAB/EPB
Type	Statement

#	108
Contributor	EFFAB/EPB
Creator	Anonymous
Date	2009
Title	Relevant legislation.
Description	List relevant legislation: poultry farm(er)s fall under the definition of food business (operators) and strict rules exist for intra and extra community trade of hatching eggs, day old chicks and other live poultry.
Subject	Poultry, EU legislations
Coverage	EU
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EFFAB/EPB
Relation	-
Rights	Intellectual property rights
Source	EFFAB/EPB
Type	Statement

#	109
Contributor	EFFAB/EPB
Creator	Bessei W.
Date	2006
Title	Welfare of broilers: a review
Description	<p>Selection for fast early growth rate and feeding and management procedures which support growth have lead to various welfare problems in modern broiler strains. Problems which are directly linked to growth rate are metabolic disorders causing mortality by the Sudden Death Syndrome and ascites. Fast growth rate is generally accompanied by decreased locomotor activity and extended time spent sitting or lying. The lack of exercise is considered a main cause of leg weakness, and extreme durations of sitting on poor quality litter produces skin lesions at the breast and the legs. Management factors which slow down early growth alleviate many welfare problems. Alternatively it may be considered to use slow growing strains which do not have the above mentioned welfare problems. Since growth is a main economical factor, there are problems of acceptability of these measures in the commercial broiler production. Stocking density is a central issue of broiler welfare. It is evident, that the influence of stocking density on growth rate and leg problems acts through its influence on litter and air quality. High moisture content of the litter enhances microbial activity, which in turn leads to increase of temperature and ammonia in broiler houses, and thus, high incidence of contact dermatitis. High stocking density impedes heat transfer from the litter surface to the ventilated room. This restricts the efficacy of conventional ventilation systems in alleviating heat stress. Lighting programmes with reduced photoperiods are considered essential for the stimulation of locomotor activity and the development of a circadian rhythm in the birds. Extended dark periods, however, reduce growth when applied in the first weeks of age. Compensation occurs when the time of the production cycle is substantially increased. Various methods to enrich the environment have shown only moderate effects on the behaviour and physical conditions of broilers.</p>
Subject	Broilers; welfare; behaviour; management; leg problems
Coverage	Review
Format	Electronic (pdf)
Identifier	DOI: 10.1079/WPS2005108
Language	English
Publisher	Cambridge University Press
Relation	-
Rights	Copyrights
Source	World's Poultry Science Journal Vol. 62, 455-466
Type	Paper

#	110
Contributor	EFFAB/EPB
Creator	Bijma, P., Bovenhuis, H.
Date	2009
Title	Developments in Quantitative Genetics and genomics Relevant for Poultry breeding
Description	<p>Developments in genetics and genomics relevant for poultry breeding are reviewed, focusing on the use of molecular information in breeding programmes and the potential for improving traits affected by social interactions among individuals. QTL mapping studies have resulted in almost 700 QTL for a wide variety of traits, showing that they have been successful. However, few applications of marker-assisted selection in commercial poultry breeding exist, mainly because evidence for the QTL is often not conclusive and confidence intervals for QTL locations are large, making utilization in practice difficult. Moreover, moving from QTL to causal mutation has been successful only in a few cases. Thus, neither MAS nor selection for known genes will greatly increase responses to selection in the near future. Genome-wide selection (GWS), however, may offer a solution. Basically GWS is a method to estimate breeding values. Simulation studies suggest that accuracies of EBVs in the range of 0.7-0.8 are feasible. Tests of GWS on real data are currently ongoing, and initial results are promising. The second section of this chapter shows that social interactions create considerable heritable variance that is hidden in classical analyses. Results show that social effects contribute more than half of the heritable variance in mortality due to cannibalism in laying hens, and in growth rate and feed intake in growing pigs. We present statistical models and breeding strategies to utilize this extra heritable variation for genetic improvement. Though social genetic effects may not always be important or may be difficult to use in some cases, the promising results observed in laying hens and pigs should be sufficient incentive for further research in this area</p>
Subject	poultry breeding, genetic, genomics
Coverage	N/A
Format	Electronic (pdf)
Identifier	ISBN: 9781845933753
Language	English
Publisher	CABI
Relation	-
Rights	Copyrights
Source	Biology of Poultry Breeding Ed P.M.Hocking
Type	paper



#	111
Contributor	EFFAB/EPB
Creator	Collett, S.R.
Date	2009
Title	Managing Current Disease Challenges
Description	<p>The need to improve the financial efficiency of the poultry breeder industry through intensification has created new challenges for today's managers. By keeping large numbers of birds in high-density housing and controlling the full range of environmental variables the manager is able to optimize the biological and hence financial efficiency of the flock. Unfortunately the psychological stress of dense confinement and the physiological stress of performing at capacity predispose these birds to metabolic disease and compromise their capacity to cope with infectious disease challenge. The biological efficiency of converting feed into disease-free viable chicks or pullets is compromised by disease challenge and the ultimate success of a breeder operation hinges on optimizing disease status through diligent biosecurity. This involves the coordination of conceptual, structural and operational measures to reduce the risk and consequence of disease. The design of such a system is based on the epidemiological characteristics of the disease and should include an orchestrated mix of immune modulation, bioexclusion, surveillance and biocontainment. Since the potential impact of disease challenge ranges from catastrophic to inconsequential it is necessary to use economic analysis in designing a disease management programme to ensure optimal resource allocation. Eradication programmes are appropriate for diseases that carry significant public health risk such as Salmonella enterica, serovar Enteritidis, those that cause a catastrophic drop in breeder productivity such as fowl plague (avian influenza), or those that through vertical transmission, have a catastrophic effect on offspring productivity. With other less-devastating disease challenges, where eradication is not justified, the focus of disease management is on limiting the risk of challenge through bioexclusion and the consequence of disease challenge through immunization or medication. There are very few sound epidemiological data on the specifics of disease risk and prevalence in breeder facilities around the world. The collection and comparative analysis of such data would go a long way to narrowing the global variance in breeder liveability.</p>
Subject	Poultry
Coverage	N/A
Format	Electronic (pdf)
Identifier	ISBN: 9781845933753
Language	English
Publisher	CABI
Relation	-
Rights	Copyrights
Source	Biology of Poultry Breeding Ed P.M.Hocking
Type	Paper

#	112
Contributor	EFFAB/EPB
Creator	Cooper, M.A.
Date	2004
Title	Selection Environment – Which should
Description	<p>Four views on the proper environment for selection of genetic stocks are discussed. The first view states that selection under environmental conditions which favor a characters full expression will result in the best progress from selection. The second view addresses the issue that selection should be practiced in as poor an environment as that in which the product being developed will ever be evaluated. The third view suggests that selection should be practiced in the environment in which the lines will be expected to perform the majority of the time. The fourth view is the most complex and requires the evaluation of offspring in multiple environments. The following literature review includes a discussion of selection response for several species in a variety of environmental conditions. The majority involve evaluation of lines selected in “good” and “poor” environments. The basic premise will apply to comparisons of lines selected in excellent environments versus those selected in more average environments. The review indicates benefits to each of the views discussed; however, Falconer &amp; Latyszewski (1952) state it best when they concluded that progress was more rapid in a good environment than in a restricted one, but that a trait is best improved by selection under the conditions in which the trait will be measured.</p>
Subject	Genetic selections, environment
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Unpublished
Relation	-
Rights	Confidential
Source	EFFAB/EPB
Type	Paper

#	113
Contributor	EFFAB/EPB
Creator	Cooper, M.A.
Date	2009
Title	Broiler & Breeder Traits Selected Upon Within a Primary Breeder and Their Influence on Welfare/Well-Being
Description	Attempt to give sufficient detail to better explain this selection and balance process with and explanation of how various traits affect the welfare or well-being of the animal, and broiler breeding is no longer focus on “just weight” as may have been the case some 30 years ago.
Subject	broiler, breeders, traits, selection, welfare
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Unpublished
Relation	#153
Rights	Intellectual property rights
Source	Cobb-Vantress, Inc.
Type	Statement

---

#	114
Contributor	EFFAB/EPB
Creator	Cooper, M.A.
Date	2009
Title	Free-range chickens are more prone to disease
Description	Chickens kept in litter-based housing systems, including free-range chickens, are more prone to disease than chickens kept in cages,
Subject	Free-range chickens, disease
Coverage	2001-2004, Sweden
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	unpublished
Relation	-
Rights	Intellectual property rights
Source	Cobb-Vantress, Inc.
Type	Statement

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#	115
Contributor	EFFAB/EPB
Creator	Cooper, M.A.
Date	2009
Title	Gait Scoring Considerations
Description	Gait Scoring Considerations.
Subject	Broiler, gait score,
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Unpublished
Relation	-
Rights	Intellectual property rights
Source	Cobb-Vantress, Inc.
Type	Statement

---

#	116
Contributor	EFFAB/EPB
Creator	Dawkins M.S., Donnelly C.A., Jones T.A.
Date	2004
Title	Chicken welfare is influenced more by housing conditions than by stocking density
Description	<p>Intensive broiler (meat) chicken production now exceeds 800 million birds each year in the United Kingdom and 2 x 3 10<sup>10</sup> birds worldwide, but it attracts accusations of poor welfare. The European Union is currently adopting standards for broilers aimed at a chief welfare concern—namely, overcrowding—by limiting maximum ‘stocking density’ (bird weight per unit area). It is not clear, however, whether this will genuinely improve bird welfare because evidence is contradictory. Here we report on broiler welfare in relation to the European Union proposals through a large-scale study (2.7 million birds) with the unprecedented cooperation of ten major broiler producers in an experimental manipulation of stocking density under a range of commercial conditions. Producer companies stocked birds to five different final densities, but otherwise followed company practice, which we recorded in addition to temperature, humidity, litter and air quality. We assessed welfare through mortality, physiology, behaviour and health, with an emphasis on leg health and walking ability. Our results show that differences among producers in the environment that they provide for chickens have more impact on welfare than has stocking density itself. Intensive broiler (meat) chicken production now exceeds 800 million birds each year in the United Kingdom and 2 x 3 10<sup>10</sup> birds worldwide, but it attracts accusations of poor welfare. The European Union is currently adopting standards for broilers aimed at a chief welfare concern—namely, overcrowding—by limiting maximum ‘stocking density’ (bird weight per unit area). It is not clear, however, whether this will genuinely improve bird</p>
Subject	Welfare broilers
Coverage	UK
Format	Electronic (pdf)
Identifier	Doi:10.1038/nature02226
Language	English
Publisher	Macmillan Publishers Limited.
Relation	-
Rights	Copyrights
Source	Nature 342, Vol 427, 342 - 344
Type	Paper

#	117
Contributor	EFFAB/EPB
Creator	Decuypere E., Hocking P.M., Tona K. , Onagbesan O. Bruggeman V., Jones E.K.M., Cassy S., Rideau N., Metayer S., Jego Y., Putterflam J., Tesseraud S., Collin A., Duclos M., Trevidy J.J. and Williams J.
Date	2006
Title	Chicken welfare is influenced more by housing conditions than by stocking density
Description	<p>A first product of this European project was a tool for scoring chick quality. A link was established between chick quality and embryonic physiological parameters such as heat production. Eggs from broiler breeders that give rise to rapidly growing broilers have a different embryonic development that may need modified incubation conditions. Within genotypes, better chick quality induces better liveability and faster growth in broiler production. Extensive data on broiler breeder production were generated. Feed restriction was necessary to maintain welfare and reproduction at acceptable levels in standard broiler breeders. The dw-experimental genotype (E) was more tolerant to ad libitum feeding. If an alternative to feed restriction had to be found, the use of a dw genotype with less severe feed restriction could be adopted. Fibre per se, or partial feed restriction during the growing period, only compensated to a small extent for the negative effects of early fast growth on later reproduction. The results of the project on behaviour did not support welfare concerns on feed restriction. They confirmed the hypothesis that environmental pecking is a displacement activity rather than a sign of frustration. Factors other than central control by pituitary hormones seem to be involved in the modulation of the laying rate. The local (intra-ovarian) role of growth factors such as Insulin-like Growth Factors (IGFs), Bone Morphogenetic Proteins (BMPs) and leptin are known to modulate the effect of gonadotrophins on ovarian function. For both BMPs and IGFs, feed restriction enhanced the interaction between growth factors and gonadotrophins as well as the proliferation of granulosa cells in vitro. Future genetic selection of broiler breeder production might aim at uncoupling the control of growth factors in the ovary from the selection for rapid growth to maintain or increase the growth rate of chicks without further penalising the already poor reproductive performance of broiler breeders. Putative quantitative trait loci for ovulation rate were identified in the project and may eventually facilitate selection by breeding companies for birds that could be fed enough feed to optimise their welfare.</p>
Subject	Broiler breeder; feed restriction; chick quality; growth factors; ovary
Coverage	-
Format	Electronic (pdf)
Identifier	doi:10.1017/S0043933906001085
Language	English
Publisher	Cambridge University Press
Relation	-
Rights	Copyrights
Source	World's Poultry Science Journal, Vol. 62, September 2006, 443 -453
Type	Paper

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#	118
Contributor	EFFAB/EPB
Creator	Fortomaris P., Arsenos G., Angeliki Tserveni Gousi, Yannakopoulos A.
Date	2007
Title	Performance and behaviour of broiler chickens as affected by the housing system
Description	Assessment of effect two different housing systems on performance and behaviour of broiler chickens
Subject	Broiler chickens, behaviour, performance, housing system
Coverage	-
Format	Electronic (pdf)
Identifier	ISSN 0003-9098, Arch. Geflügelk., 71(3). S. 97-104, 2007
Language	English / German
Publisher	Verlag Eugen Ulmer, Stuttgart
Relation	-
Rights	Copyrights
Source	Arch. Geflügelk., 71(3). S. 97-104, 2007
Type	Paper

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#	119
Contributor	EFFAB/EPB
Creator	Gentle M. J. and McKeegan D.E.F.
Date	2007
Title	Evaluation of the effects of infrared beak trimming in broiler breeder chicks
Description	Detailed behavioural observations were made of broiler breeder chicks after their beaks had been trimmed by an automated infrared treatment at one day of age or by the traditional hot-blade method at one day or seven days, or after they had been sham-trimmed or left untreated. Observations took place immediately after the treatments and at regular intervals until six weeks of age; beak length and bodyweight were also measured regularly. There were no significant effects on the behaviour of the chicks in the first hour after trimming or in the subsequent six weeks. Variability in beak length was low within the treatments and there was significant regrowth, but it was least in the birds that had been hot-blade trimmed at seven days. Both beak-trimming methods were associated with small but significant reductions in bodyweight, with the hot-blade-treated birds being more affected.
Subject	Broiler breeder, infrared beak trimming,
Coverage	-
Format	Electronic (pdf)
Identifier	The Veterinary Record 160:145-148 (2007)
Language	English
Publisher	British Veterinary Association
Relation	-
Rights	Copyrights
Source	Veterinary Record (2007) 160, 145-148
Type	Paper

#	120
Contributor	EFFAB/EPB
Creator	Heyn, E., Damme, K., Ahreur, F., Pledl, M., Sacher, C., Staudt, M., Erhard, M.H.
Date	2008
Title	Vergleichende Untersuchungen zur aufzucht von Mastahnenelterntieren der rasse Cobb und Ross unter berueckstichtigung verschiedener Futterungsvarianten. Compared research about breeding of male parents broiler of the line Cobb and Ross with different feed
Description	Compared research about breeding of broiler parents of the line Cobb and Ross with different feeding practices
Subject	Ross 308, Cobb 500, feeding
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	German
Publisher	Institut für Tierschutz und Verhaltenskunde und Tierhygiene der LMU München
Relation	-
Rights	Copyrights
Source	Institut für Tierschutz und Verhaltenskunde und Tierhygiene der LMU München
Type	Paper

#	121
Contributor	EFFAB/EPB
Creator	Heyn, E., Damme, K., Pledl, M., Staudt, M., Erhard, M.H.
Date	2008
Title	Welfare of broiler breeders, comparing different feeding systems
Description	<p>Broilers are bred for extreme growth, high feed-intake and maximum feed conversion. Because high fertility and a long reproductive life-span are desired, the prental stock of broilers is fed restricted rations under field conditions which reduce their genetically defined growth potential. The fast growing breeds Ross-308 and Cobb-500 were observed; 420 female (f) and 100 male (m) chicks. During rearing (1st to 24th week) the chicks were separated by breed and different feeding management systems. Control group A was fed a restricted diet according to the breeder's manual. Experimental group 1, (B) was fed ad libitum and experimental group 2 (C) received an energy and protein diluted (20%) diet ad libitum. At the end of the rearing period the ad lib fed animals (B up to 6554 g) weighed more than those on a restricted (up to 3650 g) or diluted feed diet (up to 6470 g). Losses were highest in the ad libitum groups (up to 48.5 %) and slightly lower in the diluted diet fed groups (up to 30.3%). Regarding bone breaking strength the animals with ad libitum feeding in most cases had the stronger bones. The behaviour patterns during rearing differed greatly between the feeding groups, Restricted fed animals were very active and showed almost no resting and feather cleaning behaviour during video observation, but increased pecking and scratching.</p>
Subject	Broiler breeder, behaviour, welfare
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	WPSA
Relation	-
Rights	Copyrights
Source	Proceedings 1st Mediterranean Summit of WPSA – Advances and Challenges in Poultry Science - Poultry Welfare. Porto Carras, Greece, 502-506
Type	Paper

#	122
Contributor	EFFAB/EPB
Creator	Hocking P.M. and McCorquodale C.C.
Date	2007
Title	Similar improvements in reproductive performance of male line, female line and parent stock broiler breeders genetically selected in the UK or in South America
Description	<p>Field data on the reproductive performance of parent stock and grandparent female line and male line broiler breeders were extracted from a commercial database covering the years of hatch from 1989 to 2002. The data were from the UK, Western Europe, Central and South America and Japan. Quadratic regression curves were fitted to the data to estimate the long-term phenotypic trends in total egg production, hatching egg production, chick numbers, hatchability and female mortality. Changes in performance over time were similar in the UK, Western Europe and Central and South America and are consistent with the suggestion that genetic selection in separate breeding programmes in the UK (supplying the UK and Western Europe) and Brazil (serving Central and South America) was associated with similar improvements in the performance of commercial parent stock and grandparent flocks. Changes in performance in Japan (supplied from the UK) were different but recent performance was similar to those in the other regions. The mean annual improvements over 10 years to 2002 for male line, female line and parent stock, respectively, were 0.4, 1.7 and 1.7 for total egg number; 0.5, 1.8 and 1.6 for hatching egg number; 0.6, 1.8 and 1.3 for total chick production; 0.25, 0.47 and 0.09% for hatchability; and -0.69, -0.05 and 0.41% for female mortality. The results are consistent with claims that significant genetic change in pedigree selection (nucleus) flocks by the primary breeding company are reflected in substantial improvements in reproductive performance in commercial flocks. The presence of similar rates of improvement in different geographical regions as a result of genetic selection in two continents representing tropical and temperate regions suggests that genotype—environment interactions for reproduction traits are not important.</p>
Subject	Reproductive performance, broiler breeders, genetic selections
Coverage	1989-2002, UK, Western Europe, Central and South America, Japan
Format	Electronic (.pdf)
Identifier	DOI: 10.1080/00071660802129853
Language	English
Publisher	Taylor & Francis
Relation	-
Rights	Copyrights
Source	British Poultry Science Volume 49, Number 3 (May 2008), pp. 282—289
Type	Paper

#	123
Contributor	EFFAB/EPB
Creator	Hodges, J.
Date	2009
Title	Emerging boundaries for poultry production: challenges, dangers and opportunitie
Description	<p>Poultry production has achieved outstanding biological and economic performance in the last 60 years as exceptional leadership harnessed science and business in the public interest, thus contributing powerfully to cheap, abundant food and improved quality of life. But unacceptable negative effects are now evident, adding to the threatened collapse in Western society that is being provoked by an unsustainable culture of materialistic consumption and self-interest. A supreme desire for profit dominates all public decisions and resource use. The balanced market economy system has been distorted into 'Elite Capitalism'. In agriculture, this deformed economic model combined with 'Elite Science' threatens both food security and the social fabric of world society. Not only are established boundaries of economic behaviour being breached but, in the process, traditional boundaries are being violated in rule of law, justice, species integrity, community and morality. The current Elite Science and business model is unsustainable and must be reshaped before it leads to major catastrophe. Leaders in the poultry sector are challenged to again show their innovation and intellectual and moral courage by re-designing the poultry sector as an example for the whole food chain to ensure global food security, a sustainable socio-economic future for both rich and poor and the survival of civilized society.</p>
Subject	Food; capitalism; sustainability; boundaries; molecular; community; law; morality
Coverage	-
Format	Electronic (pdf)
Identifier	doi:10.1017/S0043933909000001
Language	English
Publisher	Cambridge University Press
Relation	-
Rights	Copyrights
Source	World's Poultry Science Journal, Vol 65, March 2009, 5-21
Type	Paper

#	124
Contributor	EFFAB/EPB
Creator	Hoffmann I.
Date	2009
Title	The global plan of action for animal genetic resources and the conservation of poultry genetic resources
Description	<p>The Global Plan of Action for Animal Genetic Resources was adopted by 109 countries in Interlaken, in September 2007. It aims to promote a pragmatic, systematic and efficient overall approach, which harmoniously addresses the development of institutions, human resources, cooperative frameworks, and resource mobilization for the sustainable use and conservation of animal genetic resources. The Global Plan of Action contains five Strategic Priorities for Action on conservation. Countries have thereby committed themselves to develop national conservation policies, to establish or strengthen in situ and ex situ conservation programmes, to develop and implement regional and global long-term conservation strategies and to develop approaches and technical standards for conservation. Within avian breeds globally, 30% are at risk and 9% are extinct. The proportion of breeds at risk and extinct is highest in chickens. Fast structural change has been identified as one threat to genetic resources. Following the advent of highly pathogenic avian influenza (HPAI) H5N1, conservation of poultry genetic resources has been discussed. Although in situ conservation of poultry breeds is the preferred method, cryoconservation technology has advanced. Poultry genetic resources are under-conserved, and strategic approaches to conservation need to be developed and implemented.</p>
Subject	Plan of action; poultry genetic resources; poultry genetic conservation
Coverage	Global
Format	Electronic (pdf)
Identifier	Doi:10.1017/S0043933909000245
Language	English
Publisher	Cambridge University Press
Relation	-
Rights	Copyrights
Source	World's Poultry Science Journal, vol. 65, 286-297
Type	Paper

#	125
Contributor	EFFAB/EPB
Creator	Howie J.A., Tolkamp B.J., S. Avendano S., Kyriazakis I.
Date	2009
Title	The structure of feeding behaviour in commercial broiler lines selected for different growth rates
Description	<p>Selection for increased growth rate in livestock is accompanied by increased requirements for food resources. It has been suggested that more intensively selected birds, such as broilers, have altered food intake control mechanisms and may be constantly hungry, due to the high demands of fast growth rates. If this is the case, it would be a major welfare issue. We investigated the hypothesis that more intensive selection for growth in some lines of broilers has altered feeding behavior by analyzing short-term feeding behavior bouts in relation to the roles of hunger and satiety mechanisms in the control of food intake. Using 4 genetic lines, resulting from different levels of selection for growth rate, meal pattern analysis was performed and the bouting of short-term feeding behavior was estimated. All lines showed bouted feeding behavior, although differences in meal size, number of meals, and meal duration were evident across lines. In all lines, the probability of birds starting a new meal was low immediately after finishing the previous meal and increased with time, as expected for feeding behavior governed by hunger and satiety mechanisms. Normal feeding behavior was, therefore, not affected by the intensity of selection. Feeding rate increased with growth rate, suggesting that this may be a consequence of selection. However the other characteristics of feeding behavior, such as meal duration, did not change consistently with higher growth rate. Due to differences between lines in bird size, the number and weight of birds per pen also differed between the lines. The differences in feeding behavior between lines were greatly diminished when weight of birds per square meter was taken into account but were still statistically significant. Overall, it is apparent that even when growth rate and body size have been substantially altered by genetic selection, the underlying normal controls of feeding behavior are conserved in broiler birds.</p>
Subject	Broiler, feeding behaviour, genetic selection, meal characteristic, satiety
Coverage	-
Format	Electronic (pdf)
Identifier	Doi:10.3382/ps.2008-00441
Language	English
Publisher	Poultry Science Association
Relation	-
Rights	Copyrights
Source	Poultry Science 88 : 1143-1150.
Type	Paper

	126
Contributor	EFFAB/EPB
Creator	Hunton P.
Date	2006
Title	100 Years of poultry genetics
Description	The beginning of the 21st century is an appropriate time to review a century of poultry genetics, because it is one hundred years since Mendel's pioneering work was rediscovered and became part of the mainstream of science. Although, in my opinion, Mendel enjoyed more than a fair share of luck in reaching his conclusions, he nevertheless laid a foundation on which students of poultry, and many other species, were able to build a vast body of literature. Mendel's choice of the height of pea plants, in retrospect, was not a wise one. Here is a trait that is basically quantitative, and yet he was able to describe it, and reach his conclusions, in qualitative terms!
Subject	Poultry, genetics
Coverage	-
Format	Electronic (pdf)
Identifier	DOI: 10.1079/WPS2006104
Language	English
Publisher	Cambridge University Press
Relation	-
Rights	Copyrights
Source	World's Poultry Science Journal, vol. 62, 417-428
Type	Paper



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#	127
Contributor	EFFAB/EPB
Creator	Laughlin K. (Aviagen)
Date	2007
Title	The evolution of genetic breeding and productions
Description	The evolution of genetic breeding and productions
Subject	Broiler breeders, broilers
Coverage	N/A
Format	Electronic (pdf)
Identifier	ISBN 1 870 955 89 7
Language	English
Publisher	Temperton Fellowship
Relation	-
Rights	Copyrights
Source	Temperton Fellowship Report 15
Type	Report

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#	128
Contributor	EFFAB/EPB
Creator	Laughlin K. (Aviagen)
Date	2007
Title	Poultry and Aquaculture Breeding
Description	Poultry and Aquaculture Breeding
Subject	poultry, aquaculture, breeding
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FABRETP
Relation	-
Rights	Intellectual property rights
Source	FABRETP-Society Meeting, 16-04-2008
Type	Paper - presentation

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#	129
Contributor	EFFAB/EPB
Creator	Laughlin, K. F.
Date	2009
Title	Breeder management: How did we get Here?
Description	<p>Broiler breeders are managed to maximize the output of day-old chicks. This involves control of body weight, feed intake and day length during both the rearing and production periods. The relative importance of these factors has changed over time and with the commercial production strategies of different countries. Several novel concepts of managing broiler breeders have been developed in scientific studies. However, examination of the breeder management advice from commercial breeding companies shows that the precise methods have then evolved in practical use within the production industry. Some ideas, such as dwarf breeders, caged housing and artificial insemination have not gained industry acceptance to the extent which was originally assumed. Genetic improvements in breeder performance have been steady and consistent since the late 1970s but there remains a significant variation about the average performance which is an indication of the 'environmental' effect. Reducing this variation represents an opportunity for further improvement in flock performance.</p>
Subject	Broilers breeders, management
Coverage	-
Format	Electronic (pdf)
Identifier	ISBN: 9781845933753
Language	English
Publisher	CABI
Relation	-
Rights	Copyrights
Source	Biology of Poultry Breeding Ed P.M.Hocking
Type	Paper

#	130
Contributor	EFFAB/EPB
Creator	Lewis, P.D.
Date	2009
Title	Photoperiod and Control of Breeding
Description	<p>Photoperiod is the most important environmental manipulator of sexual development and reproductive activity, and changes in photoperiod exert far greater effects on sexual maturation than constant photoperiods. The critical day length to initiate sexual maturation appears to be common for all species of poultry at between 10 and 11 h with a saturation daylength of between 13 and 14 h. The photoperiodic response varies with the type of poultry and is principally dependent on whether or not the bird exhibits photorefractoriness and if so in which form. Photorefractoriness is a condition that, in its extreme, prevents gonadal maturation in the year of hatch and limits breeding to spring and early summer. Birds are hatched photorefractory and need a period of short days to dissipate the condition, the time requirement for which varies with photoperiod and the degree of feed restriction. Reproductivity is subsequently ended by the onset of adult photorefractoriness. Geese and game birds exhibit absolute photorefractoriness and have a breeding season limited to about 4 months. Their sexual maturity is indefinitely delayed when reared on long days. Turkeys, and probably Muscovy ducks, exhibit relative photorefractoriness, become sexually mature in their first year and suffer no more than a 3- to 4-week delay in maturity when not reared on short days (below critical daylength). Turkeys do not normally have their feed intake restricted and so require only about 2 months of short days to become photosensitive. Broiler breeders also exhibit relative photorefractoriness, but because their feed intake during rearing is severely restricted they need 4-5 months of short days to become photosensitive. Meat-type ducks do not exhibit photorefractoriness and rearing on short photoperiods is not essential.</p>
Subject	Poultry, photoperiod, light
Coverage	-
Format	Electronic (pdf)
Identifier	ISBN: 9781845933753
Language	English
Publisher	CABI
Relation	-
Rights	Copyrights
Source	Biology of Poultry Breeding Ed P.M.Hocking
Type	Paper

#	131
Contributor	EFFAB/EPB
Creator	Pledl M.
Date	2008
Title	Vergleichende Studie zum Verhalten und zur Gefiederqualität von sättigungsdeprivierten Mastelertieren unter dem Einfluss von drei Fütterungsvarianten [Comparative study to behaviour and plumage quality of broiler breeders, deprived of repletion under feeding programs]
Description	This study is based on the comparison of three different variants of broiler breeders of the meat breeds Cobb 500 and Ross 308. During the rearing (24 weeks) and the laying period (26 weeks) investigations were carried out in respect of behaviour in the ways of direct observations as well as the analysis of video recordings at regular four weeks intervals. Furthermore in the same intervals the condition of the plumage of a representative number of animals (20 individuals of each breed and feeding program) was assessed with regard to its quality and degree of foiling as well as evident health problems. The performance data food intake, water intake, body weight, mortality and fertility parameters were taken into consideration at the evaluation as far as they concerned the investigations.
Subject	Cobb 500 and Ross 308
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	German
Publisher	LMU University Munich Veterinarian Department
Relation	-
Rights	Intellectual property rights
Source	LMU University Munich Veterinarian Department
Type	PhD thesis

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#	132
Contributor	EFFAB/EPB
Creator	Riedstra B., and de Jong I.
Date	2004
Title	Agressie bij Vleeskuikenvaderdieren Literatuuronderzoek naar achterliggende oorzaken en probleeminventarisatie in de praktijk. [Aggression in Broiler breeders, Literature research into underlying causes and problem identification in practice.
Description	Aggression in Broiler breeders, Literature research into underlying causes and problem identification in practice.
Subject	Broiler breeders, aggression
Coverage	Review
Format	Electronic (pdf)
Identifier	Rapportnummer ASG03/0028154
Language	Dutch
Publisher	-
Relation	-
Rights	Intellectual property rights
Source	Animal Sciences Group (WuR), Lelystad
Type	Report

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#	133
Contributor	EFFAB/EPB
Creator	Sacher C. K
Date	2008
Title	Vergleichende Untersuchungen zur Stressbelastung sättigungsdeprivierter Mastelterniere unter dem Einfluss von drei verschiedenen Fütterungsgruppen [Comparative analysis regarding stress exposure of broiler breeders, deprived of repletion, under the influence of three different feeding variation]
Description	Broilers are genetically selected for fast growth and efficient food conversion. Therefore broiler breeders have to be fed restrictively in order to achieve high fertility and efficient food conversion. From an animal welfare point of view this kind of feeding poses a severe problem, as aside from the positive effects on health this restriction leads to limited welfare for the broiler breeders. As an alternative to restricted feeding it is considered to apply qualitative food restriction by diluting feed to alleviate chronic hunger of the broiler breeders. It is the subject of this study to investigate health and stress levels of broiler breeders through hematocrit, hemoglobin, immunoglobulin Y and corticosterone.
Subject	Broilers breeders , feed restrictions, stress, hematocrit, hemoglobin, immunoglobulin Y , corticosterone
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	German/ English summary
Publisher	Ludwig-Maximilians-University München, Veterinary Faculty
Relation	-
Rights	Intellectual property rights
Source	Ludwig-Maximilians-University München, Veterinary Faculty
Type	PhD thesis

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#	134
Contributor	EFFAB/EPB
Creator	Sandilands V. and Cheng H. W.
Date	2008
Title	Infrared beak treatment of domestic poultry: a review.
Description	Infrared beak treatment of domestic poultry: a review. Conducted on behalf of the British Egg Industry Council and RSPCA
Subject	Poultry, beak treatment, infrared beak treatment
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	-
Relation	-
Rights	Intellectual property rights
Source	EFFAB/EPB
Type	Paper

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#	135
Contributor	EFFAB/EPB
Creator	Skinner-Noble D. O., Teeter R. G.
Date	2009
Title	Feed restrictions for broilers breeder pullets
Description	Comparison of well being consequences of tree feed restrictions programs for broilers breeders pullets
Subject	Broilers breeders pullets , feed restrictions, behaviour, heterophil:lymphocyte ratio, well being
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Unpublished
Relation	#135
Rights	Confidential
Source	EFFAB/EPB
Type	Paper

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#	136
Contributor	EFFAB/EPB
Creator	Skinner-Noble D. O., Teeter R. G.
Date	2009
Title	Feed restrictions for broilers breeder pullets
Description	Comparison of well being consequences of tree feed restrictions programs for broilers breeders pullets
Subject	Broilers breeders pullets , feed restrictions, behaviour, heterophil:lymphocyte ratio, well being
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Unpublished
Relation	#135
Rights	confidential
Source	EFFAB/EPB
Type	Data set

#	137
Contributor	EFFAB/EPB
Creator	Skinner-Noble D. O., Teeter R. G.
Date	2009
Title	Environment, well-Being and behaviour - An examination of anatomic, physiologic, and metabolic factors associated with well-being of broilers differing in field gait score
Description	<p>An experiment was conducted to evaluate potential differences for indicators of well-being in birds classified as having field gait score (FGS)2 and 3 and to evaluate potential causal factors affecting gait score. In 2 trials, birds with FGS2 and FGS3 were similar for most broiler traits (BW, feed conversion ratio) and fearfulness. Birds with FGS3, however, had improved breast conformation score in both studies and greater breast angle in the second trial compared with birds with FGS2. This improved breast conformation, along with differing ratios of length (hip to neck/hip to tail; <math>P &lt; 0.05</math>), appears to be highly related to gait score. In other words, varying a bird's physical proportions necessitates that the bird's gait changes to maintain center of gravity during locomotion. In trial 2, behaviours were measured to determine if gait score affected behaviour. Birds with FGS3 rested more and stood less than those with FGS2. Similar pathological analysis and heterophil:lymphocyte ratio suggest that gait score differences are not due to increased physiological stress or stress-associated pain. The lack of difference in heterophil:lymphocyte ratio, respiratory quotient, and pathology, combined with differing ratios of body proportions and anatomical length ratios, suggests that behaviour and gait differences between birds with differing FGS occur with similar levels of well-being.</p>
Subject	Gait score, well-being, heterophil-to-lymphocyte ratio, behaviour, respiratory quotient
Coverage	-
Format	Electronic (pdf)
Identifier	Doi:10.3382/ps.2006-00450
Language	English
Publisher	The Poultry Science Association
Relation	-
Rights	Copyrights
Source	Poultry Science, 2009, 88:2-9
Type	Paper

#	138
Contributor	EFFAB/EPB
Creator	Z. Sokołowicz, E. Herbut, J. Krawczyk
Date	2009
Title	Poultry production and strategy for sustainable development of rural areas
Description	Selection for increased number of eggs from egg-type hens and improved meatiness of broiler chickens that has been carried out over the last fifty years as well as efforts to increase the profitability of poultry production paid scant attention to avian welfare, conservation of genetic resources and the concept of sustainable development. Many human activities in poultry production are therefore not sustainable because they are a threat to the survival of native breeds of birds (extinction of many local breeds such as naked neck and crested hens); fail to guarantee necessary conditions for high welfare levels in birds (in both conventional and alternative systems); pose a threat to human health (crowding of birds carries the risk of a rapid spread of infectious diseases, including zoonoses); and are an environmental threat (water pollution due to inappropriate application of manure to the soil, atmospheric emissions of ammonia, hydrogen sulfide, carbon dioxide and dust substances from intensive breeding systems)
Subject	Hens, welfare, sustainable development
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English (Polish summary)
Publisher	Polish National Research Institute of Animal Production
Relation	
Rights	Copyrights
Source	Annals of Animal Science ,Vol. 9, No 2 (2009) 107-117
Type	Paper

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#	139
Contributor	EFFAB/EPB
Creator	Sørensen, P., Søholm Petersen, J.
Date	2008
Title	Bone Abnormality in Broilers as Consequence of Imbalanced Calcium/Phosphor Proportion in Diet
Description	Bone Abnormality in Broilers as Consequence of Imbalanced Calcium/Phosphor Proportion in Diet
Subject	Broiler nutrition, mineral nutrition, poultry health
Coverage	-
Format	Electronic (pdf)
Identifier	non
Language	English
Publisher	Feedinfo News Service
Relation	-
Rights	Copyrights
Source	Feedinfo News Service
Type	Paper

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#	140
Contributor	EFFAB/EPB
Creator	Tolkamp B. J., Sandilands V., Kyriazakis I.
Date	2005
Title	Effects of Qualitative Feed Restriction During Rearing on the Performance of Broiler Breeders During Rearing and Lay
Description	<p>To prevent health and fertility problems associated with excessive weight gain, broiler breeders are severely feed restricted during rearing, which may affect welfare. We compared the effects of an experimental ad libitum feeding regimen based on qualitative restriction of food intake with conventional quantitative food restriction on the performance of female broiler breeders during rearing and lay. During rearing up to 20 wk of age, control birds were fed restricted amounts of standard broiler breeder mash once daily. Experimental birds had ad libitum access to the same standard mash mixed with 400 g of oat hulls/kg of feed and increasing concentrations of Ca propionate, an appetite suppressant. Mean total mash intake during rearing was 8.12 kg and did not differ between treatments. Both control and experimental birds showed an almost linear growth curve, treatment mean body weights were always within 100 g of the target weight line, and treatments did not differ for body weight uniformity. Groups were subjected to the same quantitative feed restriction from during lay. Feeding regimen during rearing did not affect number of eggs produced, egg weight, or egg quality up to 46 wk of age. We concluded that it may not be necessary to subject chicks to severe quantitative feed restriction to achieve desirable growth curves and body weight uniformity during rearing. Qualitative restriction of feed intake can achieve desirable growth curves in ad libitum fed chicks during rearing, and such a feeding regimen does not have negative effects on hen performance during lay.</p>
Subject	Broiler breeder, rearing, qualitative feed restriction, egg production, egg quality
Coverage	-
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Poultry Science Association
Relation	-
Rights	Copyrights
Source	Poultry Science 84:1286–1293
Type	Paper

#	141
Contributor	EFFAB/EPB
Creator	EFFAB
Date	-
Title	Code of Good Practice for Farm Animal Breeding and Reproduction Organisations
Description	Code of Good Practice for Farm Animal Breeding and Reproduction Organisations
Subject	Food safety and public health, product quality, genetic diversity, efficiency, environmental impact, animal health, animal welfare, and breeding and reproduction technologies
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EFFAB
Relation	# 142, 143, 144
Rights	Copyrights
Source	EFAB
Type	Guidelines

#	142
Contributor	EFFAB/EPB
Creator	Gamborg C., Olsson A., Sandøe P.
Date	2005
Title	Code EFABAR - Guide for implementation - ETHICS REPORT
Description	The aims of the report are to identify what in farm animal breeding give rise to concern in the general public and among other stakeholders, to give a systematic account of the ensuing ethical problems related to farm animal breeding, and to identify and critically discuss possible tools for handling ethical concerns in farm animal breeding. The report synthesises existing knowledge about public perception of farm animal breeding and technology, about current breeding related legislation and about key ethical concerns, building on material and extending previous work carried out in the preceding projects – ELSA (1998-1999) and the SEFABAR Network of Excellence (2001-2003) – by the Danish Centre for Bioethics and Risk Assessment (CeBRA)
Subject	Farm animal , breeding, ethics
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EFFAB
Relation	# 141, 143, 144
Rights	Copyrights
Source	EFAB
Type	Report



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#	143
Contributor	EFFAB/EPB
Creator	EFABAR
Date	2007
Title	Code EFABAR - Guide for implementation - SPECIES DETAILS (EXAMPLES)
Description	Code EFABAR - Guide for implementation - SPECIES DETAILS (EXAMPLES)
Subject	Farm animal , breeding, ethics
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EFFAB
Relation	# 141, 142, 144
Rights	Copyrights
Source	EFAB
Type	Report

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#	144
Contributor	EFFAB/EPB
Creator	EFABAR
Date	2007
Title	code EFABAR - Guide for implementation - DEFINITIONS, TERMS AND ABBREVIATIONS
Description	code EFABAR - Guide for implementation - DEFINITIONS, TERMS AND ABBREVIATIONS
Subject	Farm animal , breeding
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EFFAB
Relation	# 141, 142, 143
Rights	Copyrights
Source	EFAB
Type	Report

---

#	145
Contributor	EFFAB/EPB
Creator	FABRE Technology Platform
Date	2006
Title	FABRE Technology Platform - Sustainable Farm Animal Breeding and Reproduction A Vision for 2025
Description	Technology Platform a vision of how, in synergy with other economic and social players in Europe, a strong European animal breeding and reproduction sector can contribute to animal agriculture and aquaculture in a prosperous and distinctive Europe. TP propose this as a common agenda for all stakeholders, from research funding bodies to consumers. Through wide consultation TP propose to develop a strategic research priority plan which, if implemented, will deliver vision of the animal industries by 2025.
Subject	Sustainable Farm Animal Breeding and Reproduction
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FABRE Technology Platform
Relation	-
Rights	Intellectual property rights
Source	FABRE Technology Platform
Type	Report

#	146
Contributor	EFFAB/EPB
Creator	FABRE Technology Platform
Date	2008
Title	Sustainable Farm Animal Breeding & Reproduction Technology Platform - Strategic Research Agenda
Description	Strategic Research Agenda created by Sustainable Farm Animal Breeding & Reproduction Technology Platform
Subject	Sustainable Farm Animal Breeding and Reproduction
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FABRE Technology Platform
Relation	# 147, 148, 149
Rights	Intellectual property rights
Source	FABRE Technology Platform
Type	Report

---

#	147
Contributor	EFFAB/EPB
Creator	FABRE Technology Platform
Date	2007
Title	FABRE Technology Platform - Strategic Research Agenda Annex I Expert Reports
Description	FABRE Technology Platform - Strategic Research Agenda Annex I Expert Reports
Subject	Sustainable Farm Animal Breeding and Reproduction
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FABRE Technology Platform
Relation	#146, 148, 149
Rights	Intellectual property rights
Source	FABRE Technology Platform
Type	Report

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#	148
Contributor	EFFAB/EPB
Creator	FABRE Technology Platform
Date	2008
Title	FABRE Technology Platform - Strategic Research Agenda Annex II Horizontal Issues
Description	FABRE Technology Platform - Strategic Research Agenda Annex II Horizontal Issues
Subject	Sustainable Farm Animal Breeding and Reproduction
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FABRE Technology Platform
Relation	#146, 147, 149
Rights	Intellectual property rights
Source	FABRE Technology Platform
Type	Report

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#	149
Contributor	EFFAB/EPB
Creator	FABRE Technology Platform
Date	2008
Title	FABRE Technology Platform - Strategic Research Agenda Annex III Country Reports
Description	FABRE Technology Platform - Strategic Research Agenda Annex III Country Reports
Subject	Sustainable Farm Animal Breeding and Reproduction
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	FABRE Technology Platform
Relation	#146, 147, 148
Rights	Intellectual property rights
Source	FABRE Technology Platform
Type	Report

---

#	150
Contributor	EFFAB/EPB
Creator	Farm Animal Breeding and Reproduction Technology Platform
Date	2008
Title	FABRE Technology Platform - Implementation Plan
Description	This Implementation Plan describes the research efforts that need to be undertaken and the implementation that has to be put in place for Europe to maintain its leading role in animal breeding and reproduction, and to provide the European citizens with a diverse choice of affordable, safe and diverse quality animal foods, and the European landscape and culture with an attractive liveable countryside, a large sustainable variety of animal breeds, and tasteful local and typical animal food products. The Plan is based on the Vision Paper for 2025, and the Strategic Research Agenda (SRA) which have been developed with over 1000 specialists in Europe. The SRA effort involved thirteen expert groups, horizontal work on sociology, ethics, animal welfare, consumer research and economy, scenario development, and society discussion, and thirty four country discussions.
Subject	Cattle, Sheep and goats, Pigs, Poultry, Horses, Aquaculture, Genomics, Genetics, Reproduction, Food safety and quality, Health welfare and performance, Diversity and distinctiveness
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Farm Animal Breeding and Reproduction Technology Platform
Relation	-
Rights	Intellectual property rights
Source	Farm Animal Breeding and Reproduction Technology Platform
Type	Report



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#	151
Contributor	EFFAB/EPB
Creator	EFFAB/EPB
Date	2009
Title	The context of broiler breeding
Description	This paper aims to describe meat poultry breeding in a holistic concept, and animal welfare in the context of sustainable breeding and development.
Subject	Broiler, breeding, animal welfare
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	EFFAB/EPB
Relation	-
Rights	Intellectual property rights
Source	EFFAB/EPB
Type	Statement

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#	152
Contributor	DEFRA, UK
Creator	DEFRA, UK
Date	2009
Title	Numerical data on the incidence of infectious diseases in poultry in Great Britain between years 2005 and 2009
Description	Listed numerical data on the incidence of infectious diseases in poultry in Great Britain between years 2005 and 2009. Please note that we were unable to determine which cases were breeding birds only as this information is not always included. Premises that hold 50 birds or less are not required to register with Poultry register and are therefore not included on the list.
Subject	Poultry, incidence, prevalence, Newcastle Disease, Avian Influenza
Coverage	2005- 2009; Great Britain
Format	Electronic (doc)
Identifier	-
Language	English
Publisher	DEFRA, UK
Relation	-
Rights	Intellectual property rights
Source	DEFRA, UK
Type	Data set

#	153
Contributor	Individual
Creator	[Det Danske Fjerkræraad ] The Danish Poultry meat Association
Date	2008
Title	[The Danish Poultry meat Association - Report 2008] Det Danske Fjerkræraad - Beretning 2008
Description	Overview of poultry production in Denmark including, data on health and welfare, type of housing and management, production, product quality, market and trade.
Subject	poultry,
Coverage	2005 - 2007; Denmark
Format	Electronic (pdf)
Identifier	-
Language	Danish (English summary tables)
Publisher	The Danish Poultry meat Association
Relation	-
Rights	Copyrights
Source	The Danish Poultry meat Association
Type	Report

#	154
Contributor	Individual
Creator	Petersen J. S., David B., Waldenstedt L.
Date	2005
Title	Monitorering af benkvalitet i Danmark, Norge og Sverige [Monitoring of leg quality in Denmark (DK) Norway (N) and Sweden (S)]
Description	Monitoring of leg quality in Denmark (DK) Norway (N) and Sweden (S). In DK was studied 30 flocks (each with 100-150 chicks) in 1999 and again in 2005 by using the gait score scale 0-5 as developed by Kestin et al. 1992 on 35 day old chickens. In 1999 was found 30.1% with severe leg disorders causing a gait score of 3 or more. In the 2005 investigation on the same number of flocks, but not the same herds, that 17.6% had severe gait score. The two investigations was done by the same investigators. In the 1999 examination was found that 57% had TD and that was decreased to 0.7% in 2005. A similar study on 29 day old chickens in N in 2002 showed 2.8% of the chickens with server Leg disorders. In S was in 2002 done a similar study on 27 flocks with 18.3% with a gait score larger than 2, one of the investigators from the DK work participated
Subject	Boiler chicken, gait score, prevalence, monitoring
Coverage	1999 - 2002; Denmark, Norway, Sweden
Format	Electronic (pdf)
Identifier	-
Language	Danish
Publisher	Nordic Poultry Advisory Symposium
Relation	-
Rights	Intellectual property rights
Source	Nordic Poultry Advisory Symposium
Type	Paper

#	155
Contributor	Individual
Creator	Petersen J. S.
Date	2007
Title	Hvordan forbedres slagtekyllingernes trædepude score? [Is it possible to improve the foot pad score?]
Description	Humid litter is the major reason for development of foot pad lesion, and the ways to ensure a litter sufficient dry to avoid chicken with severe foot pad lesions. Then the development in the foot pad score in Denmark is presented since the foot pad score was initiated in 2002. At the slaughter plant 100 feet is collected randomly from each batch of chickens and given a score of 0 for no lesion, 1 for mild lesion and 2 for severe lesion. A batch then can obtain a score from zero to 200. In 2002 a regulation was laid down by the Danish parliament that farmers with batches above 40 would have a remark from the Veterinarian Authority. After two year Farmers with more than score 80 would after three batches above this figure have some restriction in density of chickens as a direct penalty. The average level in 2002 was score 90 and that has gradually decreased to 40 in 2007. These data is based on all chicken grown in Denmark or about 120 mill. per year.
Subject	Broiler chicken, foot pad lesions
Coverage	2002 - 2007; Denmark
Format	Electronic (doc)
Identifier	-
Language	Danish
Publisher	Poultry Advisory Center
Relation	-
Rights	Intellectual property rights
Source	Poultry Advisory Center
Type	Paper

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#	156
Contributor	EFFAB/EPB
Creator	Aviagen
Date	2007
Title	Ross 308 Broiler Nutrition Specification
Description	Ross 308 Broiler Nutrition Specification
Subject	Ross 308 Broiler Nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Aviagen
Relation	-
Rights	Copyrights
Source	Aviagen
Type	Guidelines

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#	157
Contributor	EFFAB/EPB
Creator	Aviagen
Date	2007
Title	Ross 308 Broiler Performance Objectives
Description	Ross 308 Broiler Performance Objectives
Subject	Ross 308 broiler Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Aviagen
Relation	-
Rights	Copyrights
Source	Aviagen
Type	Guidelines

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#	158
Contributor	EFFAB/EPB
Creator	Aviagen
Date	2007
Title	Ross 308 Parent Stock Nutrition Specification
Description	Ross 308 Parent Stock Nutrition Specification
Subject	Ross 308 Parent Stock Nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Aviagen
Relation	-
Rights	Copyrights
Source	Aviagen
Type	Guidelines

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#	159
Contributor	EFFAB/EPB
Creator	Aviagen
Date	2007
Title	Ross 308 Parent Stock Performance Objectives
Description	Ross 308 Parent Stock Performance Objectives
Subject	Ross 308 Parent Stock Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Aviagen
Relation	-
Rights	Copyrights
Source	Aviagen
Type	Guidelines

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#	160
Contributor	EFFAB/EPB
Creator	Aviagen
Date	2007
Title	Ross 708 Parent Stock Nutrition Specification
Description	Ross 708 Parent Stock Nutrition Specification
Subject	Ross 708 Parent Stock Nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Aviagen
Relation	-
Rights	Copyrights
Source	Aviagen
Type	Guidelines

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#	161
Contributor	EFFAB/EPB
Creator	Aviagen
Date	2007
Title	Ross 708 Parent Stock Performance Objectives
Description	Ross 708 Parent Stock Performance Objectives
Subject	Ross 708 Parent Stock Performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Aviagen
Relation	-
Rights	Copyrights
Source	Aviagen
Type	Guidelines

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#	162
Contributor	EFFAB/EPB
Creator	Aviagen
Date	2009
Title	RossBroilerManual
Description	RossBroilerManual
Subject	Ross broilers broiler management
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Aviagen
Relation	-
Rights	Copyrights
Source	Aviagen
Type	Guidelines

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#	163
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Breeder Management Guide
Description	Cobb Breeder Management Guide
Subject	Cobb breeder management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-1010-03
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	164
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Broiler Management Guide
Description	Cobb Broiler Management Guide
Subject	Cobb broiler management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-1020-02
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	165
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2009
Title	Cobb Brooding Fundamentals Guide
Description	Cobb Brooding Fundamentals Guide
Subject	Cobb broiler brooding
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-1060-02
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	166
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 500 Broiler Performance And Nutrition Supplement Europe, the Middle East and Africa
Description	Cobb 500 Broiler Performance And Nutrition Supplement Europe, the Middle East and Africa
Subject	Cobb 500 broiler performance and nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2114-03
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	167
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 500 Broiler Performance And Nutrition Supplement
Description	Cobb 500 Broiler Performance And Nutrition Supplement
Subject	Cobb 500 broiler performance and nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2114-04
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	168
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 500 FF Breeder Mgmt Supplement
Description	Cobb 500 FF Breeder Mgmt Supplement
Subject	Cobb 500 breeder management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2010-03
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	169
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 500 SF Breeder Mgmt Supplement
Description	Cobb 500 SF Breeder Mgmt Supplement
Subject	Cobb 500 breeder management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2020-03
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	170
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 500 FF Parent Rearing/Laying Record
Description	Cobb 500 FF Parent Rearing/Laying Record
Subject	Cobb 500 breeder performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-5010-02/L-5011-02
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	171
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 500 SF Parent Rearing/Laying Record
Description	Cobb 500 SF Parent Rearing/Laying Record
Subject	Cobb 500 breeder performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-5020-02/ L-5021-02
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	172
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Avian 48 Broiler Performance And Nutrition Supplement
Description	Cobb Avian 48 Broiler Performance And Nutrition Supplement
Subject	Cobb Avian 48 broiler performance and nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2144-03
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	173
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Avian 48 Broiler Performance And Nutrition Supplement Europe, the Middle East and Africa
Description	Cobb Avian 48 Broiler Performance And Nutrition Supplement Europe, the Middle East and Africa
Subject	Cobb Avian 48 broiler performance and nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2144-03
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	174
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Avian 48 Breeder Management Supplement
Description	Cobb Avian 48 Breeder Management Supplement
Subject	Cobb Avian 48 breeder management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2040-02
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	175
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Avian 48 Parent Rearing/Laying Record g and lbs
Description	Cobb Avian 48 Parent Rearing/Laying Record g and lbs
Subject	Cobb Avian 48 breeder performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-5041-02/L-5040-02
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	176
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2006
Title	Cobb Avian 48 Grandparent Management Guide
Description	Cobb Avian 48 Grandparent Management Guide
Subject	Cobb Avian 48grand parent management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2070-01
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	177
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 700 Broiler Performance And Nutrition Supplement
Description	Cobb 700 Broiler Performance And Nutrition Supplement
Subject	broiler performance and nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2124-03
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	178
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 700 Breeder Management Supplement
Description	Cobb 700 Breeder Management Supplement
Subject	Cobb 700 breeder management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2030-03
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	179
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb 700 Parent Rearing/Laying Record [g] and [lbs]
Description	Cobb 700 Parent Rearing/Laying Record [g] and [lbs]
Subject	Cobb 700 breeder performance
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-5031-02/ L-5030-02
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	180
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Sasso 150 Broiler Performance And Nutrition Supplement
Description	Cobb Sasso 150 Broiler Performance And Nutrition Supplement
Subject	Cobb Sasso 150 broiler performance and nutrition
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2154-01
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	181
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Sasso 150 Breeder Management Supplement - Europe, the Middle East and Africa
Description	Cobb Sasso 150 Breeder Management Supplement - Europe, the Middle East and Africa
Subject	Cobb Sasso 150 breeder management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-2050-01
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	182
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2008
Title	Cobb Hatchery Management Guide
Description	Cobb Hatchery Management Guide
Subject	Hatchery management
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-1030-02
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	183
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	2006
Title	Cobb World Quality Assurance Guide
Description	Cobb World Quality Assurance Guide
Subject	Cobb Quality Assurance
Coverage	N/A
Format	Electronic (pdf)
Identifier	-
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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#	184
Contributor	EFFAB/EPB
Creator	Cobb-Vantress
Date	-
Title	Cobb Embryo Flip Chart
Description	Cobb Embryo Flip Chart
Subject	Embryo development
Coverage	N/A
Format	Electronic (pdf)
Identifier	L-7010-01
Language	English
Publisher	Cobb-Vantress
Relation	-
Rights	Copyrights
Source	Cobb-Vantress
Type	Guidelines

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**ABBREVIATIONS**

AFSSA	Agence Française de Sécurité Sanitaire des Aliments
AGP	Antimicrobial Growth Promoter
AHAW	Animal Health and Welfare Unit
CiWF	Compassion in World Farming
DATEX	Data Collection and Exposure Unit
DEFRA	Department for Environment, Food and Rural Affairs
EADGENE	European Animal Disease Genomics Network of Excellence for Animal Health and Food Safety
EFABAR	EFABAR is a Code of Good Practice for Farm Animal Breeding and Reproduction organizations
EFFAB	European Forum of Farm Animal Breeders
EFSA	European Food Safety Agency
EPB	European Poultry Breeders
EU	European Union
FABRE	Farm Animal Breeding and Reproduction Technology Platform
FAWC	Farm Animal Welfare Council
ITAVI	Institut Technique de l'Aviculture
RSPCA	Royal Society for the Prevention of Cruelty to Animals
TOGA	Toward an information system on broiler chicken welfare: Genetic selection Aspects