Preface

In June 2004, FAWC issued its Report on the Welfare Implications of Animal Breeding and Breeding Technologies in Commercial Agriculture. While many of the issues raised in the report have been previously identified by FAWC or other bodies, such as the Agriculture and Environment Biotechnology Commission (AEBC), FAWC has brought the issues together to consider as a whole under the general heading of animal breeding.

A copy of the full FAWC report and its recommendations is available on FAWC’s website at www.fawc.org.uk or a hard copy can be obtained from the FAWC Secretariat, 7th floor, 1A Page Street, London SW1P 4PQ.

The Government attaches great importance to the recommendations of FAWC. Below are listed the Government’s responses to each of the recommendations in terms of work we have already carried out and other action that we intend to take in the future.

To avoid repetition and, as some of the recommendations cover similar areas, we have decided to group recommendations on particular subjects together and respond separately to recommendations relating to the establishment of a Standing Committee, legislation, surveillance and research.

ON-FARM ANIMAL WELFARE TEAM
DEFRA
Introduction

1. The Government welcomes the FAWC Report on the Welfare Implications of Animal Breeding and Breeding Technologies in Commercial Agriculture. Defra’s Animal Health and Welfare Strategy (the daughter strategy to the Sustainable Farming and Food Strategy) sets the long-term (10-year) strategic direction for work to improve animal health and welfare. FAWC has identified some key areas relating to livestock breeding that the Government wishes to pursue with the aim of ensuring the welfare of animals in relation to breeding procedures. Animal breeding and the use of breeding technologies is a complex, but important, issue in terms of public interest, animal welfare, ethics and sustainable animal production.

2. In terms of animal welfare, animal breeding procedures have the potential to affect negatively a very large number of animals in a short period of time. However, breeding programmes and breeding technologies also have the ability to improve animal welfare greatly. Genomics technologies can be used to identify genetic markers for specific naturally occurring traits, such as robustness, disease resistance and aggression, so that the most suitable animals can be selected for breeding. This technology, which does not involve genetic modification (GM), will become increasingly powerful as the genomes of livestock species become more fully understood in terms of both structure and function.

3. The UK has been at the forefront of the fast-moving field of breeding technologies, and the Government believes this to be an important factor when discussing this multi-faceted issue. One of the key goals of “Securing the Future” – the Government’s Sustainable Development Strategy for the UK – is encouraging innovation, particularly in the environmental and farming sectors. The Government does not wish to discourage innovation by creating additional burdens for industry, without being fully satisfied of the need for regulation. In addition, the limited scope of unilateral controls which affect producers in the UK only, makes the provisions to ensure the welfare of parents and progeny within animal breeding programmes a complex issue to tackle. A unilateral approach to controls may inhibit trade and contravene international trading legislation.

4. There are already many measures in place to control animal breeding programmes and breeding technologies in the UK but we acknowledge that there are further measures that could be adopted to ensure that animal welfare is maximised.

5. Historically, the UK revised controls on bulls, boars and stallions when genetic understanding increased and it was no longer necessary for regulation to ensure that certain deleterious traits were selected against. Instead, there is now a range of legislation with general requirements and specific provisions relating to animal breeding and to the use of certain breeding techniques. The current UK and EU legislation relating to animal breeding is outlined in the Annex. In addition, more recent Defra on-farm welfare codes include guidance on animal breeding issues. The cattle welfare code, for example, includes advice on sire selection (for example for calving
ease and progeny without horns), natural service, artificial insemination and embryo transfer.

6. We believe that one part of the way forward is, as directed by the Animal Health and Welfare Strategy, for the Government to work in partnership with industry to ensure that the UK continues to have high standards of welfare in the context of animal breeding. In recent years the UK breeding industry has put animal welfare at the forefront of its approach and is taking steps to ensure the welfare of animals. Breeding companies increasingly instigate and support initiatives and scientific research aimed at improving animal welfare (see footnote 2 and paragraphs 40 to 42 and 45). The majority also incorporate welfare-related traits such as disease resistance, robustness, body conformation, mothering ability and birth ease into their breeding programmes. The Government commends and seeks to encourage the breeding industry’s commitment to improve animal welfare with the aim of ensuring that health and welfare factors are properly represented in all breeding programmes.

7. Various international and industry bodies have provided further guidance. For example, bodies such as the International Embryo Transfer Society and the British Pig Executive (BPEX) have produced codes of good practice for the use of specific breeding techniques such as artificial insemination and embryo transfer. Breeding companies have their own separate code of good practice (see footnote 2). Additionally, many farm assurance schemes encourage adherence to good breeding practice through the stipulation of standards for their members. Examples include the requirement for careful sire selection to reduce calving difficulties and the exclusive use of halothane gene negative pigs\(^1\). Some schemes prohibit the routine use of caesarean sections and the use of certain technologies such as embryo transfer and ovum pick-up.

8. In summary, the Government believes that FAWC has brought the issue of animal breeding and breeding technologies forward and has highlighted some key areas for Government and industry scrutiny. We believe that current legislation, welfare codes and the breeding industry’s positive attitude towards animal welfare provide a sound basis for the future. However, we also acknowledge that there are areas that need to be developed further to ensure that animal welfare is at the centre of future advances in breeding technologies.

\(^1\) The Halothane Gene

For many years, breeding companies have selected against the presence of a gene linked with stress susceptibility in pigs. The halothane gene, so named because pigs with two copies of the gene (homozygous carriers) were found to show signs of extreme muscle rigidity upon anaesthesia with halothane, underlies Porcine Stress Syndrome and is associated with higher levels of mortality on farm and during transport and poor meat quality in slaughtered pigs.
Response to the Report

Recommendations concerning the establishment of a Standing Committee

Recommendation 1: 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.

Recommendation 3: 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 apparent.

Recommendation 4: 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 agriculture practice in the UK.

Not accepted

9. We do not believe that a Standing Committee, as recommended by FAWC, is the best way of safeguarding the welfare of animals in relation to animal breeding procedures for the reasons outlined below:

- **Disproportionate cost**
  10. The Government has had advisory bodies in the areas of farm animal genetics and farm animal welfare for many years – the National Steering Committee on Farm Animal Genetic Resources (FAnGR) (soon to be replaced by the National Standing Committee on Farm Animal Genetic Resources (FAnGR)) and FAWC itself – and it would not be a good use of public resources to set up an entirely new body. FAWC, being the advisory body on animal welfare, has considerable expertise in animal welfare issues, and its previous investigation of the major animal breeding issues means it is in an excellent position to play a role in tackling the potential animal welfare concerns associated with breeding procedures. This role could be enhanced by FAWC seeking input on animal breeding matters, on a case-by-case basis, from the proposed National Standing Committee on FAnGR, or by having a permanent appointee to that committee. Alternatively, FAWC could co-opt animal breeding expertise when needed.

- **No clear role for the Standing Committee**
  11. There is no clear role that such a Standing Committee could undertake in the UK without being given statutory powers that in themselves would not be proportionate or necessary. It is important to be pragmatic when considering to what extent breeding technologies need to be regulated. For example, cloning is still far from commercial introduction; it is currently very expensive and success rates are low. Additionally, the UK breeding industry has already made significant progress in considering and advancing animal
welfare (see paragraphs 40 to 42 and 45), and there is a range of encouraging initiatives in place to ensure and promote animal welfare in the context of breeding procedures (for example see footnote 1).

12. We believe that it would be disproportionate to provide the proposed Standing Committee with statutory powers. It would also be against the Government’s principles of Better Regulation to introduce new legislation when it is not clear what its benefits and risks might be in the light of future breeding practices. Furthermore, in some cases unilateral action by the UK may be impractical or not compatible with EU law, or less effective than EU-wide legislation.

- Stifling innovation

13. In accordance with wider Government policy and highlighted in Securing the Future (see paragraph 3), Defra encourages innovation within the agricultural sector to enhance the competitiveness of the UK farming industry. There is a very real danger that excessive regulation will discourage innovation (including the development and application of breeding technologies that advance animal welfare) and may damage the viability of existing UK industries, for example the dairy and broiler industries, and breeding companies, with the possible result that those industries move overseas. That, in its turn, may lead to poorer welfare for animals in the future as the UK has comparatively high animal welfare standards.

- Global nature of animal breeding issues

14. Animal breeding is an increasingly global enterprise and the roles FAWC suggests for the standing committee might be more appropriately undertaken by an EU-based or international body. The EU already has a number of initiatives in place to investigate animal breeding issues and promote good practice (see paragraph 26). It also recognises the importance of ethics and has set up the European Group on Ethics in Science and New Technologies (EGE), which has already reported to the European Commission on animal breeding issues such as cloning and genetic modification. Another European group – The European Animal Disease Genomics Network of Excellence for Animal Health and Food Safety (EADGENE) – is concerned with genetics and the genetic enhancement of animal health and welfare, for example breeding for disease resistance.

15. Rather than establish the Standing Committee that FAWC recommends in its report, we instead suggest that given their expertise in animal welfare and knowledge of animal breeding issues, FAWC themselves are ideally placed to help tackle many of the concerns raised.

16. In this respect, we propose three main roles for FAWC:

(a) To build good relationships with UK farm animal breeding companies and advise on whether there is a need to supplement the EU’s animal breeding code of good practice (Code-EFABAR, see footnote 2), that specifically relates to animal welfare issues.
(b) To advise the Government on the main breeding technology issues relating to a specific type of animal prior to the revision or development of
EU legislation so that the Government can ensure that full consideration is
given to these issues at the EU level.
(c) To advise the Government, on a case-by-case basis, whether breeding
techniques developed in the UK or overseas that fall within the definition of
a prohibited procedure in the Animal Welfare Act 2006 should be
exempted from a ban on mutilations and allowed to be carried out
commercially.

17. We are exploring with FAWC in the context of their future business plan
whether it is willing to take on this work, and will invite them to consider
seeking input from, or collaborating with, other relevant bodies in fulfilling
these roles. They may, for example, consider working with CAWC since
many of the issues raised here for farm animals are also relevant to
companion animals, and CAWC is currently examining animal breeding
concerns. We recognise that additional resources, including specialist genetic
expertise (see paragraph 10), may be required to carry out these new roles.

18. The Government recognises the importance of considering ethical as
well as welfare issues with respect to breeding technologies, and we will
courage FAWC to take ethics into account in fulfilling the roles outlined
above.
Recommendations concerning legislation

**Recommendation 2:** 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.

*Partially accepted*

**Recommendation 7:** 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.

*Not accepted*

19. The legislation relating to farm animal breeding is outlined in the Annex. Additionally, Defra’s on-farm welfare codes include recommendations relating to breeding procedures. While stock-keepers are not legally required to comply with provisions in these codes, they must be familiar with the provisions, and non-compliance with a code can be used as evidence in welfare prosecutions.

20. In terms of breeding technologies, we accept that there are some areas that do not currently fall under the legislative framework that potentially could allow breeding practices to enter agriculture uncontrolled.

21. The Animals (Scientific Procedures) Act 1986 (ASPA) is the primary piece of legislation in the UK regulating the scientific development of breeding technologies. The Act is designed to regulate experimental or other scientific procedures applied to animals and does not cover procedures classed as recognised veterinary, agricultural or animal husbandry practice.

22. In theory, as FAWC highlights, it would be possible for a breeding technique developed overseas to be introduced to the UK as recognised veterinary practice without prior evaluation here. However, the likelihood that a breeding technique with detrimental consequences for animal welfare would be introduced and take off commercially in the UK is extremely low for several reasons:

(a) On the subject of the interface between procedures falling under ASPA or being regarded as recognised veterinary practice (and falling under the Veterinary Surgeons Act 1966), the Royal College of Veterinary Surgeons’ guide to professional conduct states: "The use of any novel treatments must reasonably be expected to result in a similar or better outcome than that following conventional treatment. The veterinary surgeon must have some background knowledge of the treatment in order to make a professional judgement. When what is to be done has an experimental component, authority under A(SP)A may be necessary."

(b) If the procedure falls within the definition of a prohibited procedure (see Glossary) it would be banned unless it was later exempted from the ban
on prohibited procedures by amendment to the Mutilations (Permitted Procedures) (England) Regulations 2007. The case for exemption would be considered by Defra using a cost-benefit approach, and (if agreed by FAWC – see paragraph 16(c)) drawing upon advice provided by FAWC after consideration of the potential animal welfare implications. Any proposed exemption would go out for public consultation and be subject to debates in Parliament;

(c) If the procedure involves the use of medicines it will be subject to the Veterinary Medicines Regulations 2005;

(d) Any scientific studies conducted in relation to the procedure (for example to assess its economic or welfare advantages) would fall under ASPA; and

(e) Take-up of any new breeding procedure will be commercially driven and a procedure that is detrimental to animals’ health or welfare might well not be economically successful in the long-term.

23. These same considerations would also apply in the event that a novel breeding technique was developed within the UK – another of FAWC’s concerns.

24. There are already strict regulations at EU level controlling the deliberate release and marketing of genetically modified organisms (GMOs). These regulations apply to all GMOs including animals and their products. GM organisms are also required to be labelled at all stages of placing on the market. Anyone contravening any of these regulations would be guilty of an offence, and penalties are laid down in domestic legislation for dealing with any such offences. The transboundary movement of GM animals is also covered at international level by the Cartagena Protocol on Biosafety, which covers products in contained use or released into the environment.

25. Similar controls are in place for cloned animals and their offspring, such as the offspring born in the UK of a dairy cow cloned in the USA, that received media attention in January 2007. This calf, genetically identical to an existing non-cloned animal, would be subject to exactly the same welfare legislation as any other dairy calf in the UK, under the Animal Welfare Act 2006. Marketing the calf or products derived from it would fall under the EC Novel Foods Regulation and would not be allowed until safety assessments had been made.

26. In addition to the legislation already outlined, the EU is taking steps to understand and address the complex issues surrounding animal breeding technologies. It established the European Forum of Farm Animal Breeders (EFFAB) to look into the legal, ethical and consumer issues raised by modern breeding techniques and public interest in cloning and genetic modification. It also set up the Sustainable European Farm Animal Breeding and Reproduction (SEFABAR) research network to look at sustainable breeding
scenarios. This initiative led to the Code-EFABAR project\(^2\), which has developed an EU-wide code of good practice for breeding companies. The code was adopted in 2005 and, although voluntary, is likely to have a high take-up by breeding companies. Additionally, the Farm Animal Breeding and Reproduction Technology Platform (FABRE-TP) has been initiated by EFFAB, drawing together the farm animal breeding industry and other stakeholders, and has recently drafted its Strategic Research Agenda. The FABRE-TP initiative is widely supported in Europe by a partnership of industry bodies.

27. The Government supports the work that has been done by the EU in this area. Commercial breeding is increasingly an international industry and it is appropriate for measures on animal breeding to be implemented at such a level. We are particularly encouraged by the development of the code of good practice for breeding companies. We suggest that FAWC advises as to whether there is a need to supplement any of the animal welfare aspects of Code-EFABAR which could be taken forward on a UK or EU basis (as proposed in paragraph 16(a)).

28. FAWC expressed concern that the way in which paragraphs 20 and 21 of the annex to EU Directive 98/58/EC (see Annex) are worded makes interpretation difficult. As EU legislation is discussed and reviewed over coming years we will take this into account and seek to address it when opportunities arise. Furthermore, during the development or review of relevant EU legislation we will request FAWC’s advice on the main breeding technology issues of concern (as proposed in paragraph 16(b)) and encourage the EU to consider fully the welfare implications of breeding technologies.

29. The Government will also consider the possibility of providing additional advice for farmers on breeding issues in all future welfare codes. We will consider incorporating guidance on best practice in relation to animal breeding into any relevant welfare advisory campaigns we run for farmers via our contract with ADAS.

\(^2\) Code-EFABAR

A Code of Good Practice for European Farm Animal Breeding and Reproduction (Code-EFABAR) has recently been developed through an EU-funded project initiated by the European Forum of Farm Animal Breeders (EFFAB). This voluntary code, aimed at breeding organisations, has been developed through consultation with stakeholders, including commercial breeders, farmers’ organisations, NGOs, and policy makers. The code addresses six key subjects, one of which is animal health and welfare, and aims to become the standard tool for defining and maintaining good practices for farm animal breeding across Europe.

The code states that breeding organisations must: ensure the health and welfare of the animals under their care; treat the animals under their care with respect; and ensure that selection for production traits is balanced by appropriate attention to reproduction traits and health- and welfare-related traits.

EFFAB will encourage breeding organisations to implement the code, will provide training and advice and will review the code every two years in consultation with stakeholders.
Recommendations concerning surveillance

Recommendation 5: 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.

Recommendation 6: 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.

Partially accepted

30. A targeted surveillance system of farms, where new breed types or breeding technologies are put into practice, could present some difficulties and would require the close cooperation and collaboration of breeding companies and of farmers themselves. It must be recognised that in some areas there may be confidentiality and data protection issues and thought must be given to encouraging farmers to participate on a voluntary basis. FAWC has suggested a period for review of not less than 5 years but for some species it may be more appropriate to work on the basis of generation time given the varying lifetimes of livestock species. However, there are already some industry schemes involving data collection, for example the BPEX pig health scheme3.

31. In order to assess the consequences of breeding strategies or new technologies on the ‘target’ farms, it would be necessary also to collect data from ‘normal’ farms for comparison and analysis. The Government, under the Veterinary Surveillance Strategy, is in the final stages of a pilot veterinary sentinel network project on cattle farms (in Yorkshire). The project has involved a group of 31 veterinary practitioners and data has been collected both from specific on-farm surveillance visits and from the veterinary practices on their general visits to cattle clients. The farms for the specific surveillance visits have been selected using a random sampling technique to ensure that

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3 BPEX pig health scheme (July 2005-July 2008) (www.bpex.org/bphs)

The BPEX pig health scheme is part-funded by Defra and other industry bodies. Veterinary surgeons record health information for finished pigs in certain abattoirs on specific assessment days, on for example lung lesions, peritonitis, milk spot liver and tail biting.
they are representative. The visits have now been completed and the results will be available shortly. The general practice data collection is still ongoing. The results will indicate whether this is a practical and economic method of measuring the prevalence of certain diseases and disease syndromes, including welfare indicators such as the prevalence of lameness and mastitis.

32. The Veterinary Surveillance Strategy recognised the need for the capture of animal health and welfare data at farm level. While the pilot sentinel project uses private veterinary surgeons for health and welfare assessment, on-farm welfare problems on both ‘target’ and ‘normal’ farms could alternatively be assessed by Animal Health (formerly the State Veterinary Service(SVS)). We will also consider the possibility of using abattoir data to inform welfare assessments made by Animal Health.

33. Other methods of collecting data on or identifying on-farm welfare problems may be through the take up of farm health planning, a key initiative of the Animal Health and Welfare Strategy, on a wider basis. The Government has been promoting farm health planning in the various species through a partnership approach with industry.

34. The information management system Rapid Analysis and Detection of Animal-related Risks (RADAR) developed under the Veterinary Surveillance Strategy and now an operational system, gives benefits in pulling together data from a variety of datasets. Various enhancements to RADAR continue to be made, including the addition of new datasets, for example population data for poultry, sheep, goats, deer and pigs. With the agreement of the breeding companies and breed societies, their data could possibly be used in RADAR in conjunction with clinical/welfare data collected, at a future point. Again, there may be data protection and confidentiality issues with this approach.

35. We already have in place basic procedures to identify the emergence of new breeding technologies on farms and to determine the welfare impact of breeding procedures. In the first case, Animal Health’s operational instructions include the need to identify and report new husbandry techniques or practices identified on farms, including novel breeding technologies, thereby providing some level of surveillance. In the second, attention is given to breeding procedures during the on-farm welfare inspections undertaken by the Animal Health. FAWC receives reports into these issues on a quarterly basis and the findings are published.

36. 6223 welfare inspections were conducted by Animal Health in 2005, at which 4313 assessments were made on whether natural or artificial breeding procedures cause or are likely to cause injury or suffering. Full compliance with legislation was reported for 93% (4030) of these breeding assessments and compliance both with legislation and with the welfare codes was reported for 76% (3274 assessments). Of the 7% (283) of assessments reported as showing non-compliance with legislation, 1% (47) were associated with unnecessary pain, unnecessary distress. All non-compliances are acted upon and cases are followed until they are fully resolved either by taking immediate corrective action, providing advice, writing to confirm the legal requirements
and outlining how these could be met or formal enforcement action which might include a notice or initiation of prosecution procedures in some cases.

37. These surveillance data enable us to monitor changes over time, and can also be used to identify factors linked with welfare violations as a result of breeding procedures, for example enterprise type, animal sector, geographical region or farm size, which can then be used to improve targeting of SVS inspections. We will consider how to use these data better – with relevant consideration given to data protection issues – and consider whether it would be appropriate to include more detailed inspection requirements in this area.

38. Although the exact nature of the data to be collected has yet to be decided, the new EU Directive on the welfare of broilers will require data to be collected from slaughterhouses on welfare problems associated with farmed broilers. One use of these data could be to determine whether some breed types are more or less well adapted to coping with the environment provided. This approach is something that could be extended to other animal groups even if in this case the data does not prove useful in identifying welfare issues specific to different broiler strains.

39. The extent to which breeding companies should collect and report back on-farm welfare-relevant data over a specified number of years when new animal strains are first used commercially is one area of good animal breeding practice that FAWC may wish to consider advising on (proposed in paragraph 16(a)). A considerable volume of work has already been achieved by breeding companies, such as the Robust cow research project (see footnote 4) but more work could be done in a number of areas.
Recommendations regarding research and training

Recommendation 8: 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.

Accepted

40. In relation to the specific research issue that FAWC highlights in this recommendation – research into the development of husbandry systems to support the demands of new genotypes – the Government has not yet sponsored research in this area, because it is difficult to foresee what genotypes will need to be catered for in the future. Additionally, this is an area in which the industry should take the lead. Indeed, breeding companies have already taken steps towards this, and several have conducted research into husbandry features, such as lighting programmes, in relation to the animal strains they supply.

41. With respect to training, the Government encourages breeding companies to ensure that farmers are aware of the environmental and husbandry requirements of their animals, particularly where animals with highly selected genotypes need a high level of stockmanship. Breeding companies have an interest in their stock thriving and, therefore, need to offer effective research-based advice on how their animals should be managed. Many breeding companies already actively do this, for example some produce management manuals specific to the different animal strains they supply, provide on-farm support and guidance, or organise roadshows to offer practical advice to farmers. Breeding companies that already do this are likely to continue to do so as new genotypes are developed.

42. The Government believes that the industry has made significant progress in the areas of research and training in breeding technologies and the needs of modern and novel genotypes but we recognise that there is more work that could be done. We will continue to take opportunities to encourage and work in partnership with industry, and will continue to commit funding to research into breeding and breeding technologies to help identify issues and solutions for the industry.

43. Research into breeding technologies and their capacity to advance animal welfare is something that the Government takes very seriously. Indeed, we have already funded a number of research projects on breeding and breeding technologies (outlined further on the Defra website). These include:

- Identification of factors and mechanisms in embryo culture associated with large offspring syndrome;
- Genetic control of resistance to gastrointestinal parasites in hill sheep;
- Marker assisted selection applied to commercial sheep;
• Identifying and characterising robust dairy cows⁴;
• Prepubertal selection for daughter fertility in dairy bulls;
• Developing a fertility index;
• Genetic selection for improved pre-weaning survival of piglets;
• Selecting for reduced aggression in pigs;
• The molecular biology of sex determination and sexual development in birds; and
• Precision selection tools to reduce the requirements for food restriction in broiler breeders.

44. These projects are in line with our Animal Health and Welfare Strategy, which as part of its “Vision for the Future” states that in 10 years we want to be at a point where “Potential threats to animal welfare such as new biotechnology, novel husbandry systems and newly farmed species and genotypes are identified, assessed and effectively managed”. They are also inherently linked with the need to create a sustainable farming and food sector, which is listed in Defra’s strategic priorities.

45. We acknowledge the amount of progress that breeding companies have already made in this area. Not only is the industry working with Defra to support research examining the links between genetics, breeding technologies and animal welfare but it is also involved in EU research efforts, for example projects to look at leg health in turkeys, and genetic tools to improve pig welfare. Additionally, many breeding companies conduct independent research into welfare issues specific to the animals they produce.

example of Defra/industry research: The Robust Dairy Cow (www2.defra.gov.uk/research/project_data/More.asp?I=LK0657)

This three-year project, initiated in 2004, is a LINK collaborative research project bringing together Government, academic researchers, eight industry organisations, and an animal welfare body.

A robust dairy cow can be defined as one that adapts well to a wide range of environmental conditions. The principal aims of the research project are to:
• Determine whether increased longevity, health and welfare can be achieved by including traits underlying ‘robustness’ in breeding indices, and to consider the impact on animal welfare; and
• Determine the feasibility and desirability, with respect to animal welfare, of including an indicator of environmental sensitivity that would allow breeders to select bulls that are environmental ‘specialists’ or ‘generalists’.

⁴ Example of Defra/Industry research: The Robust Dairy Cow (www2.defra.gov.uk/research/project_data/More.asp?I=LK0657)
Glossary

**Animal Welfare Act 2006**: The primary piece of legislation protecting the welfare of kept animals, which replaces and updates previous legislation regarding the welfare of farmed and domestic animals, bringing them all together for the first time.

**Artificial insemination**: The implanting of live spermatozoa into the genital tract of the female.

**Breeding programme**: Process of producing animals to a certain genetic specification over a number of generations.

**Breeding technology**: Any breeding method other than natural copulation used to accelerate genetic change.

**Cloning**: The production of a cell or organism with the same nuclear genome as another cell or organism.

**Embryo collection/transfer**: Collection of a fertilised ova/embryo from one female before being implanted in another female to complete the gestation.

**Farm Health Planning**: A key initiative under the Animal Health and Welfare Strategy, enabling farmers to understand the true costs and benefits to their business and animal health and welfare of husbandry practices, so that farmers can plan to adopt practices that are most effective and cost efficient on their farms.

**Genetic marker**: A gene or DNA sequence having a known location on a chromosome and associated with a particular trait, often used to identify an animal with the trait.

**Genetic modification**: The altering of the genetic material in an organism in a way that does not occur naturally by mating or natural recombination or both.

**Genomics**: The branch of genetics that studies organisms in terms of their genomes (the complete set of genetic information of an organism).

**Genotype**: The genetic composition of an organism.

**Ovum pick-up**: An ultrasound guided oocyte (immature ovum) collection technology.

**Phenotype**: The appearance of an organism, resulting from the interaction of its genetic constitution with the environment.

**Prohibited operation**: A procedure which involves interference with the sensitive tissues or the bone structure of an animal, otherwise than for the purpose of its medical treatment, except those listed as exemptions in the Mutilations (Permitted Procedures) (England) Regulations 2007.

**Robust**: Describing an animal that is adaptable to a wide range of environmental conditions.
Annex: UK and EU Legislation Relevant to Animal Breeding

The primary legislation relating to animal breeding technologies in the UK is:

(a) The Animal Welfare Act 2006 (in Scotland the Animal Health and Welfare (Scotland) Act 2006);  
    *makes it an offence to cause unnecessary suffering to any animal*

(b) The Veterinary Surgeons Act 1966;  
    *defines acts of veterinary surgery and sets out how they may be performed*

(c) The Animals (Scientific Procedures) Act 1986.  
    *protects the welfare of experimental animals by licensing projects as well as the researchers and establishments that undertake animal experimentation*

Legislation also exists to govern specific breeding techniques. Exemptions to the ban on mutilations in the Animal Welfare Act 2006 are listed in the Mutilations (Permitted Procedures) (England) Regulations 2007. Embryo transfer in cattle is covered by the Bovine (Collection, Production and Transfer) Regulations 1995, under which an individual must be satisfied that a cow receiving an embryo is suitable to bring it to term and calve naturally before the technique can be used, and the Veterinary Surgery (Epidural Anaesthesia) Order 1992. Artificial insemination is covered by the Artificial Insemination of Cattle (Animal Health) (Amendment) (England) Regulations 2002 and the Veterinary Surgery (Artificial Insemination of Mares) Order 2004. These specify detailed requirements under which artificial insemination can be practised.

EU law on animal breeding procedures is contained in EU Directive 98/58/EC, the Annex of which states:

20. Natural or artificial breeding or breeding procedures which cause or are likely to cause suffering or injury to any of the animals concerned must not be practised.

    This provision shall not preclude the use of certain procedures likely to cause minimal or momentary suffering or injury, or which might necessitate interventions which would not cause lasting injury, where these are allowed by national provisions.

21. No animal shall be kept for farming purposes unless it can reasonably be expected, on the basis of its genotype or phenotype, that it can be kept without detrimental effect on its health or welfare.

This EU law has been transposed into law in England by the Welfare of Farmed Animals (England) Regulations 2000 (soon to be replaced by similar legislation made under the Animal Welfare Act 2006) and by similar legislation in Northern Ireland, Scotland and Wales.