CHAPTER 8

THE USE OF ANIMALS IN AGRICULTURAL AND WILDLIFE RESEARCH

Agricultural Research

8.1 Animal experiments for agricultural purposes are conducted by a number of universities as well as departments of agriculture in each State and the Northern Territory. No comprehensive statistics of the number of animals used in agricultural research are available.

8.2 The CSIRO supplied details of the use of animals for agricultural research during the period 1981-82 to 1983-84. In this three year period, 40,042 animals were used. Of this number, only 15.8 per cent of cattle and 43.8 per cent of sheep were involved in laboratory tests, while the balance underwent husbandry tests. According to the explanatory note provided by the CSIRO the distinction between laboratory and animal husbandry tests is that:

> In laboratory tests it is taken that some intervention to the animals occurs, eg injection, bleeding, or dosage of a drug or infectious Agent. In animal husbandry tests, animals are subjected only to normal farming practices, with the possible exception of occasional weighings, for example in an animal breeding trial.[1]

8.3 Although the main aim of agricultural research involving animals at the CSIRO is to improve productivity and reduce costs in the livestock industries, many of the projects have resulted in improvements in the welfare of animals. For example, research at the Division of Animal Health has produced benefits for both humans and various species of farm animals:

> The Division directs its main research effort towards alleviating the major bacterial and parasitic disease problems of the grazing sheep and cattle industries, with some research into pig and poultry diseases. Emphasis is placed on the production of new and improved vaccines and vaccination procedures and the genetic basis of disease resistance in animals.[2]

8.4 In the departments of agriculture and universities, animals are used in agricultural research to improve both the welfare of the animals and the economics of the livestock industries.

Types of Experiment

8.5 Many of the farm animals used in experiments at the CSIRO are not subject to pain or distress. At most they are likely to experience minor discomfort. As the CSIRO pointed out in its submission:

> ... the techniques applied are the same as, or very similar to, those used by farmers and the standard of general management is usually better. These include experiments to evaluate improved pasture species, grassland management techniques or the results of selective mating of animals which show superior performance for some productive character.
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> In such cases the research techniques are mainly ways of measuring production, e.g. weighing animals; dyebanding wool; weighing fleeces at shearing; measuring milk production from cows or ewes milked by machine or manually; and measuring meat production through carcass measurements following slaughter. Additional methods may involve collection of samples of blood, urine, faeces or tissue (with appropriate local anaesthesia), the injection of radioisotopically labelled substances in concentrations not hazardous to the animal or the operator, and oral dosing with an inert marker substance for measurement of faecal output.[3]

8.6 Some animals are restrained in metabolism crates in the course of nutrition experiments. Normally the animal is able to move and lie down but cannot turn completely around. The reason for such restraint lies in the nature of the research.

8.7 In a number of institutions, sheep have fistulae created which are fitted with cannulae or tubes into parts of the alimentary tract to enable samples of the contents to be collected regularly from living animals.

8.8 The purposes of these interventions include the sampling of rumen contents for nutritional research, the study of micro-organisms within the rumen, or the introduction of substances directly into the rumen. According to the evidence before the Committee such animals tend to live out a lifespan which is normal for the species and remain in good health and body condition.[4]

8.9 The types of experiment which have caused the most pain and distress to the animals involved were mainly designed, paradoxically, to find better ways to relieve or prevent pain and distress in farm animals. These experiments involve research into animal diseases including the establishment of their cause, the efficacy of new methods of treatment or prevention; and the investigation of poisoning in grazing animals caused by plant associated toxins. An example of the first category is research into foot rot in sheep and of the second is the research into annual ryegrass toxicity.

8.10 The second category relates to toxins which cause extensive mortalities in grazing animals. When a new poisoning problem arises the only way to determine whether a given feed or sample of feed is toxic is to actually feed it to the species concerned. Identification of the specific toxic compound will require still further feeding of extracts of the original feed to animals until it can be concentrated and separated out from the range of compounds present in the original feed. Once the toxin is chemically defined, chemical assessment methods may then replace the use of animals.

8.11 CSIRO identified the following principles which it saw as essential in designing such experiments:

> The minimum number of animals is used; with toxins that appear to cause pain, every effort is made to use end-points other than pain and unpleasant death to the animal; and analgesics and anaesthetics are used if undue pain is apparent at any stage.[5]

8.12 The fact that animals will be the direct beneficiaries of such research does not remove the need for rigour and thoughtfulness in the application of such principles at the stage in the planning of such experiments and in their assessment by ethics committees.

8.13 An example of the need for rigour and in experimental design is provided by an experiment drawn to the attention of the Committee in the ANZFAS submission:

> Example Ellis, T., et al, **Protection of recently shorn sheep against adverse weather using plastic coats,** Aust Vet J 62 [no.7, 1985] 213-217.
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> Recently shorn sheep were cold stressed by continual wetting in a cool room, with fans to simulate wind, in order to test the protective effect of plastic coats ('polyethylene rubbish bin bags'). There were four groups of ten sheep. One group were kept dry and exposed only to room cooling. Another were give coats after 10.5 hours, by which time they were hypothermic. One did not improve and had to be killed after 2.5 hours. One group had coats from the start of the wetting. One group were wetted but not given coats. The stress was continued for 90 hours. Several sheep became severely hypothermic and depressed and were killed.[6]

8.14 Commenting on this experiment, Dr Alexander, who appeared for AFWA, said:

> I think we could say that there are probably better end points than death, or more humane end points than death. I think that experiment could have been refined, from an ethical point of view...

> The point I am trying to make is that the same result could have been got with perhaps a more humane end point, rather than going to the death of the animal. The body temperature could have dropped a couple of degrees and they could have obtained the same result.[7]

8.15 It is evident that in the years since those experiments were done, a greater awareness of animal welfare has changed attitudes to pain and distress in experiments. Some experiments once condoned will no longer be acceptable to experimenters or to ethics committees. CSIRO, as a co-sponsor of the Code of Practice, has taken a number of steps in recent years to improve animal welfare in research projects under its control.

8.16 The effectiveness of the vetting by ethics committees of State Government experimental projects involving farm animals is not so clear. The Committee looks forward to the enactment of legislation in the States which have not yet upgraded prevention of cruelty to animals legislation to ensure that such experimental projects are approved by ethics committees established and operating in accordance with the guidelines set out in the Code of Practice.

8.17 Although the Committee has primarily used CSIRO evidence in this chapter, it did notice during its inspections of animal houses a number of similar experiments taking place. The comments in this chapter apply not just to the CSIRO but also to other institutions or government authorities which use animals in agricultural research.

Experiments Involving Native and Feral Animals

8.18 There is relatively little research done in Australia which involves native animals. Scientists gave a number of reasons for the use of any native animals in experiments. First, there are the benefits to humans arising from improved understanding of biological processes of native animals. This relates to the use of native animals in biomedical research. According to the NHMRC:

> By studying native fauna, basic knowledge of biological systems that have general relevance to mammalian biology, agriculture and to human medicine will be gained. Some examples include:
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> - the genetic control of sex determination and the hormonal control of sexual differentiation and descent of the testes;...
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> - the influence of lactation on mammalian reproduction;
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> - the mode of action of hormones in inducing gene expression for milk protein synthesis, using the peculiar properties of the marsupial mammary gland;
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> - investigation of differentiation and development of the nervous system, with the potential for understanding and subsequently alleviating nervous disorders in man and other animals;...
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> - use of parasites and diseases of native mammals as laboratory models in studies aimed at alleviating human morbidity and controlling human diseases.[8]

8.19 Proponents of the use of native animals in experiments acknowledged that the quest for improved biological knowledge is restricted by ethical considerations. The NHMRC admitted that public sensitivity about the use of native animals in biomedical research suggests that the limits of public acceptance in this area may be narrower than in research using other species.

8.20 Experiments are also conducted on wildlife to obtain more effective and humane methods of controlling them with less detrimental effects on non-target species. Within this area of research specific projects may present difficult decisions for an ethics committee, such as research using traps to check on the contents of dingos' stomachs and LD50 tests to examine the effect of 1080 baiting on non-target species.

8.21 Finally, information from experiments can lead to improvements in the management of habitats and the ability of authorities to conserve endangered species with consequential

benefits to native animals. The conservation of native species is of concern to scientists and animal welfare organisations. ANZFAS expressed the view that it:

> ... endorses such scientific research which results in direct benefits to indigenous species, whether those benefits arise from research into disease control or other such applicable knowledge, thus enhancing the well-being and conservation of native species, but only where no pain or suffering is inflicted in the pursuit of such knowledge. This type of research should be merely observing native animals in their own environment or involve animals which are themselves already diseased and which therefore would benefit in their immediate treatment from the experiment.[9]

8.22 When representatives of ANZFAS were questioned on the Federation's policy, Dr Hampson replied:

> I think the ethical point there, which needs to be taken into consideration, is that as far as I am aware most species that are endangered at the current time are endangered because of what we have done. They are endangered because we have interfered with their habitats, for example, or because we have interfered with other species that have upset the balance in such a way that species have become endangered. I do not see that there is a more pressing ethical point for protecting an endangered species than for saving life in general ... The ethical point here is the degree of invasiveness of the experiment that you are going to do in order to save the endangered species. I would find it hard to imagine experiments where you would be killing endangered animals in order to save endangered animals, for example. You would be far more likely to be doing something that is done out in the field and is less likely to be invasive, and so on.[10]

Supply, Handling and Husbandry

8.23 Most native animals are protected by State and Territory laws which make specific provision for the issue of licences for scientific research. All proposals to capture fauna in the wild

are subject to the approval of the responsible fauna authority. Before capturing native animals, an experimenter must obtain a permit giving details of animal species, numbers of individuals and the location of the proposed capture.

8.24 It is now standard practice for State and Territory fauna authorities to require the experimenter to obtain approval from the ethics committee of the institution at which the researcher is based before a permit is issued.

8.25 Although there is no formal co-ordination between the fauna authority and the ethics committee, no evidence was received by the Committee indicating dissatisfaction with this system. Nevertheless, ethics committees might consider co-opting officers of the fauna authority to assist in the assessment of particular wildlife research projects. This practice has been followed successfully by the CSIRO Division of Rangelands and Wildlife Research Animal Ethics Committee at Gungahlin in the Australian Capital Territory.

8.26 There are, however, problems specific to the handling, care and supply of native fauna which are dealt with in this chapter because of their bearing on the argument as to whether native fauna should be the subject of research outside their natural environment.

8.27 The problems encountered in the capture, handling and care of native fauna, are often different to those for purpose-bred or domesticated animals used for experimental purposes. A working party of the NHMRC warned that:

> Investigators should bear in mind, however, that interactions between the stresses of capture, restraint and housing, artificial nutrition, anaesthesia and pre-existing illness may affect experimental parameters.[11]

Observational Studies of Wild Animals

8.28 Even apparently unobtrusive observations of wild animals may have an undesirable impact on breeding behaviour. Mrs Large appearing for the New South Wales Government's Animal Welfare Bureau commented:

> There may be no actual suffering inflicted on the animals by that observation, but there is the potential for that observation to disrupt, say, the reproductive cycles of those animals, with catastrophic consequences, perhaps, for endangered species.[12]

8.29 This point is emphasised by a British scientist Dr C.M. Perrin who in consideration of ethical issues raised by field experiments offered the following example:

> ... an observer who can be seen by a nesting bird may cause the bird to reduce its visits to the nest or to desert the nest altogether. Even walking along a beach at low tide in mid-winter may seriously interrupt the very limited time available for feeding by wading birds. At such critical periods of the year if enough people do this the birds' survival may be jeopardised. From the scientific viewpoint it is essential that the observer tries to understand the effect of his own behaviour on his study animals and to minimise it or make allowances for it: without this insight the whole study may be invalidated.[13]

Marking of Fish, Birds and Animals

8.30 Techniques used for marking animals include tagging, freeze branding or toe clipping. These all involve catching the animal, marking it and releasing it within its original territory. The techniques of trapping, are of course species and location specific. The stress involved will vary with the specific techniques of trapping and marking and the species involved.

8.31 Whatever the technique involved, frequent recapture of marked animals is required in order to allow for repeated observations of the individual animals.

8.32 The alternative to the repeated trapping and handling of individual wild animals with its associated stress is the use of individual marks that can be seen and identified at a distance. The limitations are that it can only be carried out in a restricted number of individuals because of the difficulties of making individual marks easily recognisable. Examples of markings include the use of colour rings, wing tags, ear tags, collars and the dyeing of hair or feathers.

> These techniques considerably reduce the stress of repeated catching but, by their nature, the rather more striking markings may have other deleterious effects. As many as eight colour-rings have been put on individual birds, back-tags on grouse have been thought to destroy their camouflage and make them more at risk to predators. It has been suggested (actually without good evidence) that the neck collars used on swans may reduce the nesting success by making it more difficult for such individuals to obtain a mate.[14]

Radio Telemetry

8.33 This technique is used for tracking of wild animals. It enables a large number of observations to be made of the movements and behaviour of an individual animal without the need to recapture it.

8.34 Miniaturisation of the transmitter and its power source have largely dealt with one aspect of intrusiveness by substantially reducing the size of the equipment..

Capture

8.35 Some species of native fauna are bred in captivity for research purposes. Even if breeding were more widely undertaken this would not be suitable for projects oriented toward research into the behaviour and functioning of animals and birds in their natural environment.

8.36 Trapping presents its own set of difficulties, irrespective of whether the intention is to obtain a live animal or a dead specimen, particularly guaranteeing minimum pain where death is intended and minimum stress when capture is desired. Trap surveillance needs careful thought to prevent unnecessary pain or distress. There is also the problem of minimising the capture, death or maiming of non-target species.

Conclusions

8.37 The Committee believes that endangered species should only be subject to experiments which are designed to conserve that species. Such projects should be subjected to careful scrutiny to ensure that the research projects are well founded and are likely to have positive outcomes for the endangered species.

8.38 Experiments on other wildlife, particularly native fauna, should also be examined carefully by ethics committees to ensure that the scientific merit and value justify the use of such animals. Wherever possible, purpose-bred animals must be used. The use of native animals in experiments can evoke emotive responses within the community and protocols involving native animals need to be dealt with sensitively. The added stress of capture and confinement of wild animals is an extra dimension which must be taken into account in the consideration of protocols.

8.39 The Committee does not support a complete ban on experiments that might cause some pain or distress to wildlife. However, experimenters must have a very good case to justify experiments which do cause pain or distress. In no event must such experiments cause more than minimal pain as required under the Code of Practice.

8.40 Special attention must be paid to the planning and assessment of projects involving the holding of captured native fauna for any period of time. The Committee endorses the following guidelines laid down by the NHMRC.

4. Animals should only be taken from the wild if animals bred in captivity are not available or are unsuitable for the specific research purposes.
5. If it is necessary to capture animals from the wild, steps must be taken to minimise the distress caused to the animals.
6. Research institutions and funding bodies should work towards the establishment of new breeding colonies and to the development of improved husbandry techniques within those colonies.
7. Endangered animals should only be used when the research will be of direct benefit to the conservation of the species and will not further endanger the species.
8. Investigators must seek expert advice prior to applying to the AEEC. They must thoroughly acquaint themselves with details of the appropriate care, housing and diet for the species to be studied. Handling techniques and experimental methods may differ from those used with other laboratory animals and extrapolation of existing techniques for those animals may not be appropriate.[15]

8.41 The Committee RECOMMENDS that ACCART in co-operation with the relevant bodies with specialist knowledge draw up appropriate guidelines and standard operating procedures for the capture of wildlife and their housing, nutrition and management in captivity.

Wildlife Research in Australian External Territories

8.42 Questions were raised in the Senate on 18 February 1988 and 22 February 1988 concerning the conduct of wildlife research in Australian Antarctic Territories and Macquarie Island. Subsequently, the Minister for the Arts, Sport, the Environment, Tourism and Territories, commissioned the Antarctic Science Advisory Committee (ASAC) to prepare a report on Research Involving Animals in Antarctica.

8.43 The matters dealt with in the ASAC report to the Minister, which was made public in May 1989, fall within the scope of the Committee's inquiry into animal experimentation. The relevant conclusions and recommendations were :

Conclusions

* The techniques used in current Australian research projects involving live animals are justified on conservation grounds and are being administered humanely. There are no better humane ways of collecting this information which is needed for the development of conservation strategies. There is every reason, on conservation and animal welfare grounds, why the projects currently suspended should be allowed to continue. Valuable scientific information will be lost if they do not proceed. The activities of Australia's Antarctic researchers have been commented on favourable by an observer from the Australian Conservation Foundation.

...

* Australian Antarctic scientists are amongst the leaders in the use of humane methods for collecting scientific data on Antarctic animals. To consolidate and continue Australia's progress in achieving high standards in wildlife research, there is a need to develop a code of practice specifically to cover research on Antarctic animals. There is no international code and the existing NH & MRC code on animal research is inappropriate. The new code should include provision for an independent animal care and ethics committee which should review all proposals involving Antarctic animal research.

* Current legislative provisions governing research activities in the Antarctic are unnecessarily complex and require rationalisation and simplification. In the short term there is scope for improved communication of current requirements to researchers. In the longer term, there should be a review of current Commonwealth legislative provisions governing Antarctic activities undertaken with a view to rationalising them and simplifying their administration. The Antarctic Division should also implement measures so that there is an immediate focus of responsibility for oversight of Antarctic environmental management. Such a focus should include scientists, policy experts, logistics co-ordinators and independent specialists.[16]

Recommendations

* a code of practice be developed to cover research involving Antarctic animals ... and that this include provision for an animal care and ethics committee to assess future proposals for Antarctic research projects;

* encouragement be given to research involving the development or refinement of techniques (such as use of anaesthesia and radioactive isotopes) which will enable biological information to be collected from Antarctic animals with minimum effects to them;

* improvements to techniques for anaesthesia on seals ... be evaluated as a matter of urgency in relation to future applications of anaesthetics to these animals;[17]

8.44 The difficulties experienced in the projects mentioned in the Senate point to the need for assessment of all projects involving animal research by a properly constituted ethics committee. Given the endorsement of the Government of the Ross Committee recommendation G26 that 'Commonwealth bodies which breed, hold or use animals in experiments adopt and immediately implement the NHMRC/CSIRO Code of Practice and Guidelines for the Care and Use of Animals in Research in Australia', it is a matter of some concern that the Code's requirements with respect to the composition and operation of animal ethics committees had not been implemented within the Antarctic Division. The evidence[18] was clear that while researchers outside the Division were having projects scrutinised by the ethics committee of the institution of which they were members, those by researchers from within the Antarctic Division itself were not.

8.45 The Committee does not believe that evidence was presented in the report to enable the conclusion to be drawn that application of the Code of Practice to wildlife experiments is inappropriate. The Code of Practice is currently used by scientists conducting wildlife research in Australia in various environments, including Antarctic research conducted by CSIRO officers.

8.46 In view of the working party's recommendation in Appendix G of the Report on the development of a code of practice for wildlife research in Antarctica, there was obviously some confusion as to the nature of a code of practice and its role in the assessment of experiments on animals.

8.47 The working party confused a code of practice with detailed guidelines. A code of practice sets out the administrative arrangements for approval of protocols; the responsibilities of experimenters, ethics committees and institutions; and the principles under which experiments on animals should be carried out. It does not prescribe the actual techniques, procedures and practices which experimenters should carry out on animals in the field. These should be set out in a separate document.

8.48 The Committee RECOMMENDS that Antarctic research protocols be assessed and approved under the Code of Practice and that additional detailed guidelines be drawn up on the techniques, procedures and practices to be used by experimenters on animals in the Antarctic.