

## **ANIMAL WELFARE (TRANSPORT WITHIN NEW ZEALAND)**

### **CODE OF WELFARE 2011 REPORT**

#### **Introduction**

1. The draft Animal Welfare (Transport within New Zealand) Code of Welfare (the Code) has been developed by the National Animal Welfare Advisory Committee (NAWAC), pursuant to the Animal Welfare Act 1999 (the Act). This report accompanies the Code recommended by NAWAC to the Minister, as required by section 74 of the Act.

The report notes:

- the reasons for NAWAC's recommendations;
  - the nature of any significant differences of opinion about the Code, or any provision of it, that have been shown by the submissions; and
  - the nature of any significant differences of opinion about the Code, or any provision of it, that have occurred within NAWAC.
2. In providing this report, NAWAC notes that it fully considered all submissions it received and reviewed relevant scientific literature, and that there was debate among NAWAC members on many points. This report is not required to, and does not attempt to, show every detail of the analysis and discussions that took place.
  3. There are a number of minimum standards where the animal welfare implications are self-evident and require no explanation for their inclusion. NAWAC has decided that it will not provide comment on these minimum standards or recommended best practices, but will provide explanations on minimum standards which it believes are complex or controversial or on which it received submissions with significant differences of opinion. Minimum standards as drafted may have been amended for a number of reasons, including to make them legally robust, to ensure a more effective coverage of the issue, or to change from a recommended best practice to a minimum standard (or vice versa).
  4. It should be noted that the Act does not define "significant differences". While there were a variety of opinions expressed in the submissions, NAWAC did not consider that all differences necessarily represented significant differences of opinion. NAWAC has taken the view that significant differences are either where there are large numbers of submissions which are contrary to a minimum standard in the Code, or where a submission puts forward a justification based on scientific evidence or good practice for a different or alternative minimum standard. NAWAC notes that some individuals or organisations may interpret "significant differences" in a way that varies from the NAWAC view.
  5. This code applies to all live animals, including aquatic animals, being transported within New Zealand in all forms of conveyance whether on land, in domestic airspace or New Zealand territorial and inland waters (which includes shipping to and from the Chatham Islands). This includes transport over long and short distances. The transport of animals by air to other countries is covered by the International Air Transport Association (IATA) regulations and the export of cattle, sheep, deer and horses by sea is covered by MAF standards which are given legal effect when attached to animal welfare export certificates issued under the Animal Welfare Act.

### **Why do we need a code of welfare for transporting animals within New Zealand?**

6. The transportation of animals may be associated with many stressors for the animals. The purpose of this Code is to encourage all those responsible for transportation of animals to adopt the highest standards of husbandry, care and handling, to equal or exceed the minimum standards. While there is an existing code of recommendations and minimum standards on the welfare of animals transported within New Zealand, it was written under previous legislation and no longer reflects good practice, current science and available technology. It also has no legal effect.
7. The Act specifies that owners and persons in charge of animals (including those persons responsible for undertaking the transport of animals) must meet the needs of animals in their care. It does not specify how to meet these needs. Nor does it describe how those responsible for ensuring compliance with the Act might determine whether or not these needs have been met. Additionally, the Act functions to avoid unnecessary or unreasonable pain or distress being caused to animals but does not list the areas or practices in which this might be a concern and the ways in which it might be avoided. This is the function of the codes of welfare.
8. It is essential that owners and persons in charge of transporting animals within New Zealand know what the needs of animals in their care are, in order that they can act lawfully as well as meeting the welfare needs of the animal. This code of welfare for the transport of animals within New Zealand fulfils this requirement and constitutes the Government's statement of policy in this regard. It sets out the Government's expectations regarding appropriate treatment of animals being transported within New Zealand and identifies what is considered to be inappropriate treatment of these animals. It is expected that owners and persons in charge will use this code as guide to best practice and that those required to ensure compliance with the Act will use it to assist in identifying unacceptable practices.
9. Key needs are described in the areas of: individual responsibilities for meeting code requirements, stockmanship and competency, equipment design and maintenance, preparation and selection of animals for transport, loading and unloading, travel, the provision of food, water and rest, ventilation, monitoring, specific requirements for land, sea and air transport, transport in emergencies, emergency humane destruction and quality management.

### **Code preparation and public submissions**

10. The Act allows for any individual or organisation to draft a code of welfare. The Code of Welfare for Transport within New Zealand was drafted on behalf of the Animal Welfare Directorate of the Ministry of Agriculture and Forestry (MAF). As required by the Act, representatives of those likely to be affected by the Code were consulted during its preparation and before public notification. These included companies and organisations involved in the commercial transport of animals by road and sea, producers, veterinarians, animal advocacy groups and environmental agencies.
11. NAWAC considered the Code to ensure that it complied with the purposes of the Act, that it was written clearly so as to be readily understood, and that representatives of those likely to be affected by it had been consulted. At that time, as with all codes of welfare, NAWAC did not make any final decisions on the Code until it had received submissions.

The Act requires the Code to be publicly consulted, and for NAWAC to come to any conclusion prior to this consultation would have meant that NAWAC was not following due process by acting in a biased and predetermined manner.

12. The Code was publicly notified on 16 October 2009 by notices in the major newspapers in Auckland, Wellington, Christchurch and Dunedin. In addition, it was sent to specific interested groups and stakeholders, including the Society for the Prevention of Cruelty to Animals, the New Zealand Veterinary Association, Road Transport Forum NZ, New Zealand Pork, Federated Farmers of New Zealand, Meat and Wool New Zealand (now Beef + Lamb NZ), Stock Effluent Working Group, Dairy New Zealand, and NZ Road Transport Association. The closing date for submissions was 30 November 2009.
13. A total of 31 submissions were received during the public consultation period. All submissions were carefully considered by a subcommittee appointed by NAWAC to review the Code. A summary of submissions was prepared and NAWAC's responses to the submissions were noted.
14. The subcommittee reported the Code back to NAWAC on 19 May 2010 for final consideration and approval for recommendation to the Minister. The Code and report were subsequently peer reviewed by Dr Drewe Ferguson, an animal welfare scientist at CSIRO Livestock Industries with experience in behavioural and physiological responses to stress, including transport.

### **Key issues**

15. There were no significant issues or concerns raised from the public consultation on the 2009 draft Code of Transport within New Zealand. However, the entire process of transport is, by its nature, stressful for animals. The report therefore addresses the main issues associated with the process of transport that have the potential to cause distress to animals and outlines the reasons why NAWAC has made the recommendations that it has within the Code.

### **16. Transport of animals**

#### **(a) *For what reasons are animals transported?***

Transportation of animals is undertaken for a number of reasons: to relocate animals for purposes of sale and slaughter, for breeding, for grazing, for competitive events, for veterinary attention and for many other purposes. However, transportation and the associated practices of loading, unloading and handling of the animals unavoidably causes them stress and can have significant effects on their welfare (Baldock and Sibly, 1990; Cockram et al. 1996; Hall and Bradshaw, 1998; Swanson and Morrow-Tesch, 2001).

#### **(b) *Why does transport cause animals to become stressed?***

The process of transport involves a combination of both physical and psychological stress. Types of physical stress that animals may be subjected to during transport include hunger, thirst, fatigue, injury and thermal stressors. Psychological stressors that they may experience include fear arising from restraint, handling and environmental novelty (Swanson and Morrow-Tesch, 2001; Warriss, 2004).

**(c) *How does this affect the animals physiologically?***

Transportation of animals, and the associated increase in stress, induces a large range of physiological changes including changes in the cardiovascular, endocrine, immune and reproductive systems (Knowles and Warriss, 2000). Heart rate has been shown to increase during transportation in a number of species (Stewart et al., 2003; Bergeron et al., 2002; Waas et al., 1997) and a simultaneous activation of the hypothalamic-pituitary-adrenal system causes a release of glucocorticoids from the adrenal gland (cortisol in mammals; corticosterone in birds) (Lay et al., 1996). The increase in glucocorticoid concentration in the blood in response to transport can be maintained for up to seven days after the journey has been completed (Tyler and Cummins, 2003).

A number of studies have also shown that animals may be of an increased susceptibility to infection during transport due to the increased levels of stress (Warriss, 2004; Stull et al., 2008), shedding of pathogens between animals (Barham et al, 2002; Beach et al., 2002) and cross contamination by pen mates and by facilities that have not been sufficiently disinfected between uses (Barham et al, 2002; Collis et al., 2004). Elevated levels of glucocorticoids are also known to have a deleterious impact on an organisms' immune system (McEwen et al., 1997). These immune changes can lead to immunocompromised individuals who are more susceptible to disease and this can, in younger animals, result in mortality (Swanson and Morrow-Tesch, 2001). Suppressed immune functioning during and/or following transport has been shown to occur in a range of species including livestock (Stanger, et al., 2005; Swanson and Morrow-Tesch, 2001), companion animals (Bergeron et al., 2002) and laboratory rodents (Toth and January, 1990; Aguila et al., 1988).

**(d) *What different factors can affect how an individual animal responds to transport?***

The management system to which an animal has been exposed to prior to and following transport (Grandin 1997; Tennessen et al., 1984; Hall et al., 1998; Broom, 2000), the nutrition it has received (Cole et al., 1986; Phillips et al., 1982; Schrama et al., 1996) and the genetic make-up of the individual (Nyberg et al., 1988; Zavy et al., 1992) will influence how each animal responds to transport stress. The age and size of the animal will also influence the effect that transport has on an individual. Smaller animals require more calories per unit body mass and hence, under conditions of transport, may become dehydrated more quickly, and hence experience stress more quickly than larger animals (NRC 2006). Some animals that have been managed under extensive conditions with little or no prior contact with humans will have a substantial fear response with even the slightest contact with humans (Grandin 1997; Tennessen et al., 1984; Broom, 2000). Individual behavioural responses to handling have also been shown to be heritable and so can vary widely (Burrow and Corbet, 2000; Kadel et al., 2006). Some studies have shown that quieter, more docile animals lose less weight as a result of transport and recover weight more quickly than do more highly strung animals (Burrow et al., 1998; Colditz et al., 2006).

## **17. Human/Animal Interactions**

### **(a) *The techniques that the stockperson employs can have a substantial effect on the welfare of the animal during transport.***

The response that an animal exhibits in response to human handling and presence is important in regards to their welfare. The behaviour of the persons handling animals during activities such as transport directly contributes to the behaviour that the animals display, and hence their stress levels (Grandin, 1997; Hemsworth and Coleman, 1998; Hemsworth, 2004). Studies have shown that livestock perform better when handled and raised by people who have an affinity for animals (Hemsworth et al., 1994). Other studies have shown that calves that have been raised in a 'negative handling' environment (and hence exhibit a high level fear of humans) are more difficult to load for transport and sustain a higher incidence of injuries than those raised in a 'positive handling' environment (Lensink et al., 2001). These studies emphasise the importance of the stockpersons' attitude towards the animals and this aspect of transport is covered within this Code.

## **18. Conveyances used for Transporting Animals**

### **(a) *Vibration, noise and movement of the conveyance.***

The noise, movement and vibration of the transport vehicle is unfamiliar to animals (Wikner et al, 2003) and therefore elicits a stress response (Dantzer and Mormede, 1983; Locatelli et al., 1989; Hall and Bradshaw, 1998). Vibration, related to vehicle design, and the associated movement of the transport vehicle has been shown to induce physiological responses indicative of stress which may be more stressful to the animals than vehicle noise (Carlisle et al.1998; Hall and Bradshaw, 1998). The state of the roads on which animals are transported is also an influential factor on the degree of stress that an animal will experience and animals transported on rougher secondary roads show a greater stress response than those transported for the same amount of time on smooth highways (Ruiz de la Torre et al., 2001). The amount of vibration and noise of conveyances can be minimised by maintaining the vehicle in good working order.

## **19. Loading and Unloading Facilities**

### **(a) *Maintenance of facilities used for loading and unloading livestock.***

Loading and unloading can be extremely stressful processes for animals (Hall and Bradshaw, 1998; Maria et al., 2004). The stress response can be minimised during loading and unloading by careful handling and good design of loading facilities (Fisher et al., 2009; Grandin, 2007). Livestock generally prefer to move uphill rather than downhill, will move towards lit areas and prefer areas that are uniformly lit with no shadows or sharp contrasts in lighting (Diffay et al. 2002).

## **20. Preparation of Animals for Transport**

### **(a) *Pre-conditioning animals to adapt better to transport.***

To enable livestock to better tolerate the effects of transport stress they are often put through a programme of pre-conditioning prior to transport (Schwartzkopf-Genswein et al., 2007). Depending on the species and age of the animal, animals often go through pre-conditioning processes as a consequence of yarding, handling and confinement for other

purposes. Processes can include activities such as weaning, vaccination, parasite treatment and changes in nutrition or physical processes such as shoe removal. Performance of these processes prior to transport will enable the animal to better adapt to transport.

Conditioning animals prior to transport can significantly reduce the amount of stress they experience during the event (Schwartzkopf-Genswein et al., 2007).

**(b) *Sedating an animal is not recommended during transport, except under exceptional conditions and on a case by case basis.***

In the past sedatives have been prescribed to alleviate stress, especially during air transport (Zachary, 1975). However, the incorrect use of these drugs has been shown to account for 50% of animal deaths during airline transport (Tennyson, 1995). Sedatives should only be used on a case by case basis and in cases where, without their use, there would be a significant risk of harm to animal or handler.

**(c) *Some species of animal are prone to motion sickness during transport.***

Monogastric species can be susceptible to effects of motion sickness during transport (Randall and Bradshaw, 1998; Bradshaw et al., 1996; Breton, 2009). The effects of motion sickness can be minimised by withdrawing food from animals prior to transport (Overall, 1997).

**(d) *Mineral supplements can be advantageous for some animals.***

The provision of suitable mineral supplements can be beneficial for some animals during transport, especially those which may be pregnant or physiologically compromised in some way (Fisher et al., 1999).

**(e) *Some species of animal can benefit from pre-transport rest.***

If animals are kept extensively and hence have been mustered for transport, resting animals in the property yards prior to transport can be beneficial for some species (Fisher et al., 1999; Lapworth, 2004a). The optimal rest-before-transport period will be dependant on the time taken to muster and handle the animals, distance to be travelled and the current weather conditions.

**(f) *Pre-transport food and water withdrawal***

The practice of pre-transport feed and water deprivation is a controversial and complex issue. Apart from animal welfare, it is recognised that the application of pre-transport food and water deprivation can also influence food safety, product quality and environmental (ie. effluent spillage from vehicles) outcomes. Livestock are often held off green feed prior to transport to limit the gastrointestinal contents and hence reduce excretion in the transport truck (to reduce slipping), to reduce faecal contamination if the animals are destined for slaughter (Wesley et al., 2005), to limit motion sickness (Overall, 1997) or because it is not feasible to feed or water them during the journey. Although some suggest that a period of food and water deprivation prior to transport improves the capacity of ruminants to cope better with transport, there is insufficient scientific evidence to support this view. For example, we do not know if less effluent in trucks reduces the amount of slippage and improves the ability of animals to maintain their balance during the journey.

Feed deprivation or hunger is one of the more variable stressors, the duration of fasting dependent on factors as diverse as the time of day the animals are due to be transported to the normal duration of lairage in different processing plants. It is perhaps the single stressor most easily able to be managed. Fisher et al. (2011) found that sheep in variable body condition adapted with up to 30 hours off food by mobilising their fat reserves without any evidence of metabolic depletion (e.g. depleted blood glucose or high meat pH).

Lapworth (2004b) recommends that cattle are given 6-12 hours off feed prior to transport, but the optimum time for each animal will vary according to the species of animal, the age (e.g. see bobby calves in section 24), the climatic conditions, length of the journey. Other factors such as the nutritional background and the physiological state and intended purpose of the animals following transport are also important. NAWAC has recommended 4-12 hour periods off pasture prior to transport for ruminants. This appears well within the animals' capacity to adapt to fasting rather than the greater welfare compromise observed with more prolonged fasting (Fisher et al. 2011).

## **21. Selecting and Accepting Animals for Transport**

### **(a) *Animals have to be in good health prior to being loaded onto a vehicle for transport.***

As transport is a stressful experience for animals it is important that they are in good health prior to being loaded on the transportation vehicle. The importance of selecting only physically fit livestock to be transported has been emphasised in the scientific literature (Grandin, 2001).

## **22. Loading and Unloading**

### **(a) *The techniques and processes used during loading and unloading of animals (especially in a commercial situation) can have a huge influence on the welfare of the animal.***

Loading can be an extremely stressful process for animals (Hall and Bradshaw, 1998) and has been shown to be more stressful than unloading (Maria et al., 2004), although both processes cause stress. The amount of stress experienced during loading (and unloading) will vary by species, with sheep being the least affected by a normal efficient loading process, cattle being sometimes affected, pigs always affected and poultry that are handled by humans will be severely affected (Broom, 2000). In addition, any animal, irrespective of species, will show extreme responses to handling and loading if it is injured or is frightened by people (Broom, 2000).

### **(b) *Should the use of goads to aid in the moving of animals be allowed?***

The use of goads to move animals will cause the animals to become nervous and fearful, as shown by their behaviour. The use of electric goads and physical goads such as sticks will obviously cause pain and their use should therefore be kept to a minimum wherever possible (D'Souza et al., 1998; Hemsworth et al., 2002; Rushen et al., 1999). Due to their potential to cause pain and distress, the use of electric prodders is restricted to adult cattle only.

## 23. Travel

### (a) *The length of the journey should be minimised wherever possible.*

Both short and long journeys can have a negative effect on the welfare of animals (Werner et al., 2007). Studies have shown that loading and the initial period of transportation is usually the most stressful for an animal (Bradshaw et al., 1996; Knowles et al., 1995; Nwe et al., 1996) and once animals adapt to the journey, stress levels usually decrease (Eldridge et al., 1988; Knowles et al., 1995), although there can be additional increases in cortisol if the motion of the vehicle changes (e.g the road becomes rougher) later in the journey (Bradshaw et al., 1996; Randall and Bradshaw, 1998).

The duration of a journey does affect the degree of impact that the transport has on animals (Grandin, 2007; Perez et al., 2002). On longer journeys, the effects of food and water deprivation become more pronounced and fatigue is more likely (Lambooy, 1988). Animals that are transported longer distances tend to lose more body weight and hence, it will take them longer to return to their original weight following transportation (Brown et al., 1999). Studies have shown that adult animals are able to tolerate transport for relatively long periods of time. Some studies have concluded that a journey of 15 hours (Warriss et al., 1995) and 31 hours (Knowles et al. 1999) is not excessively physically demanding for cattle but in the latter study many of the cattle chose to lie down after 24 hours, suggesting that at the point they required rest at that time. Younger animals will be affected by the weight loss associated with transport more than will older animals (Lewis, 2008) and studies have shown that for bobby calves there is a direct relationship between journey length (and hence time taken to complete the journey) and number of mortalities (Cave et al., 2005).

### (b) *Unfamiliar animals should not be mixed during transportation.*

If adult animals are taken from different social groups, irrespective of whether they are from the same farm, and are mixed with unfamiliar and incompatible conspecifics prior to transport, there is a risk of aggressive behaviour occurring between individuals. This can result in an increase in injuries and bruising and a related increase in stress levels (Pearson and Kilgour, 1980; Anil et al., 2006; Knowles, 1999).

### (c) *The effects of stocking density on animals during transport.*

There are two opposing views regarding the effect of stocking density for helping or hindering balance for livestock in transit. One view is that livestock should be transported at a high stocking density (with little room per individual) so that each individual can prevent falling or slipping by bracing against each other (a view supported by some commercial truckers). The other view states that livestock should be transported at low stocking density (with a greater amount of room per individual) to help them to avoid slipping and/or falling by enabling each individual to adopt an independent wide stance (a view supported by Cockram et al., 1996; Broom, 2000; Jones et al., 2010). Providing animals with more room during transport also provides them with the opportunity to sit or lie down should they prefer to transport in the recumbent position (Cockram et al., 1996). Some animals prefer to travel in this position (e.g deer, cats) and giving animals the opportunity to do so will help reduce fatigue during transport (Knowles et al., 1998). The provision of a lower stocking density also enables animals to keep cooler during warmer



weather and therefore decreases the risk of animals being subject to heat stress under unfavourable conditions (Schrama et al., 1996; Knowles et al., 1998; Fisher et al., 2002).

NAWAC believes there is sufficient evidence that both too much and too little space can be detrimental to the welfare of animals during transport (e.g. Eldridge and Winfield 1988, Eldridge et al. 1988, Tarrant et al. 1992; Cockram et al., 1996, Knowles et al., 1998). The optimal stocking density for animal transport will depend on a range of animal and transport factors and NAWAC has therefore recommended providing animals with appropriate space allowances to reduce stress during transport.

**(d) *Rest stops are recommended under some conditions during transport.***

For journeys longer than 24 hours, an 8 hour rest in a good quality lairage with access to food and water is beneficial to allow stock to eat and rehydrate before continuing the journey; however this rest must be of a sufficient period that the animals do have time to settle and will then take on board food and water (Knowles et al. 1996; Cockram et al., 1997). The potential benefits of rest stops must be weighed against the cost of increasing the journey time overall. Stops are provided to enable animals to rest, to take on food and water and to recover from the previous leg of the journey. It is important therefore that these stops do benefit the animals, and do not instead add additional stress to the journey. When animals are travelling well under good conditions, it is probably better to complete the journey in the least amount of time without rests. However, this must be achieved within acceptable limits and it was therefore recommended by NAWAC that animals are given the opportunity to rest every 24 hours.

**(e) *Provision of shelter and shade during lairage.***

Animals are often held in lairage during transport, either prior to undertaking the journey, during the journey to enable animals to rest, or after reaching their destination and prior to slaughter (if they are being transported for this purpose). Lairages are often exposed to the elements and animals held here are hence susceptible to climatic extremes. Although animals are often not held in lairages for extended lengths of time, it is important that during this time animals are provided with the means to protect themselves from extremes of weather. Studies of poultry have shown that the positioning of cages containing poultry during transport and holding, and the associated temperatures the birds are exposed to, can have a significant effect on mortality of the birds (Barbosa Filho et al., 2008) and animals, especially young animals, can experience large changes in body temperatures in relatively short periods of time and the provision of shade and shelter can significantly improve the amount of heat an animal loses and hence improve its welfare under extreme conditions (Gregory et al., 1999). If conditions are hot and sunny while holding animals in lairage, animals can be susceptible to developing heat stroke if not provided with shade (Fisher et al., 2009; Mitchell and Kettlewell, 1998; Warriss et al., 2006). In addition, some species, for example pigs, are prone to becoming sunburned if exposed to the sun even for short periods of time (Jackson and Cockcroft, 2007).

## **24. Food and Water**

**(a) *What are the recommendations for food and water intake during transport?***

Animals often undergo a restriction in food and water intake during the process of transportation. Many animals respond to transportation stress by voluntarily reducing their

intake of food and water and this has been observed in horses (Friend et al., 1998; Waran et al., 1995) and cattle (Knowles et al., 1999). However in many cases, food and water is not provided during, or for a period immediately prior to, or after transporting.

Pre-conditioning animals to consume the type of food that they will be presented with during transport (as it may be different from that that they are used to on a day to day basis) will encourage an animal to eat during transport when food is made available and this, in turn, will reduce the amount of stress that an animal experiences during transport. The relative short duration of journeys for transport within New Zealand means that pre-conditioning of animals is rarely undertaken.

Where animals are not provided with feed or water during transport, they will vary in their ability to cope with this withdrawal, depending on their species, age and physiological state and the level of pre-transport access to feed and water (Fisher et al., 2009). They will therefore differ in the extent that they display effects of feed and water withdrawal such as weight loss and fatigue (Fisher et al., 2009). The climatic conditions during the journey will also influence an animals' ability to cope with the withdrawal of food and water, with cold conditions increasing the effects of feed withdrawal and hot conditions increasing the effects of dehydration (Fisher et al., 2009). Relative to monogastrics such as pigs, ruminants have a higher capacity to cope with transport and associated feed and water withdrawal periods. Fisher et al., (2010) has shown that healthy adult sheep, transported under good conditions, can tolerate transport durations and associated feed and water deprivation of up to 48 hours, without undue compromise to their welfare.

**(b) *Why are there tighter restrictions in relation to the provision of food and water for younger animals?***

Younger animals are less physiologically tolerant of long periods of fasting than adult animals. One study showed that there were no significant changes in physiological indicators of stress when 5-10 day old calves had food withdrawn for 30 hours and were transported for 12 hours (Todd et al., 2000), suggesting that the detrimental effects of food and water restriction during transport can be minimised if the calves are slaughtered within 30 hours from the start of transport (Todd et al., 2000). Other studies have suggested that the fact that there were no significant changes in the calves' physiological indicators of stress may not be due to the fact that the calves are unaffected by transport, rather that they are so young that they are, as yet, physiologically unadapted to cope with transport (Knowles et al., 1997). Studies examining mortality in transported young calves may support this theory (Knowles, 1995). The feeding of young calves has been linked to critical body temperature and maintaining this critical temperature during transportation is important to maintain the calf welfare (Schrama et al., 1993).

**25. Provision of ventilation**

**(a) *What effects can the thermal conditions experienced by the animals have on their welfare?***

The thermal conditions that animals experience during transport will influence their welfare during transportation (Fisher et al., 2009). Some species of animal are especially susceptible to the effects of heat stress during transport, for example pigs and poultry (Averos et al., 2010; Fisher et al., 2009; Mitchell and Kettlewell, 1998; Warriss et al., 2006) and within different species of animal, some breeds are naturally better adapted

than others to cope with the temperatures that may be encountered during transport. One example of this is *Bos indicus* versus *Bos taurus* cattle where *Bos indicus* possess loose skin, large ears and a hump on their back making this species more adapted to coping with the high temperatures that can be experienced during transport. Although less of a common problem during transport of livestock, *Bos taurus* are better adapted to cope with colder climates than are *Bos indicus* (Godfrey et al., 1991) and so may be affected to a lesser degree by cold stress during transportation.

Companion animals also vary in their physiological ability to cope with transport. Short-haired dogs and cats are less likely to suffer from the effects of heat than long- or dense-haired varieties. Breeds of dogs with flattened faces (brachycephalic dogs e.g. bulldogs) are prone to experience problems such as impaired breathing and overheating during transportation.

The extent of the problems experienced by animals can also be influenced by husbandry techniques, for example, the thermal susceptibility of sheep will be influenced by the length of their wool (Fisher et al., 2009) and young animals may be more susceptible to problems related to temperature extremes as their thermoregulatory systems may not be sufficiently developed to be able to cope with the temperatures to which they are exposed (Knowles, 1995; Knowles et al., 1997). Animals are most at risk of suffering the effects of excessive heat when vehicles are standing stationary in warmer weather for periods of time with little air movement (Fisher et al., 2002; Stewart et al., 2010). Well-ventilated vehicles are important when transporting animals during warmer weather (Fisher et al., 2002).

## **26. Driving style during transportation**

- (a) ***The style that the driver uses, particularly in the commercial transport of animals, can have a large effect on their welfare.***

The style of driving that the driver employs can affect the physiological responses of animals to transport (Baldock and Sibly, 1990; Fisher et al., 2009). Changes in balance during transportation has been shown to be primarily responsible for shifting, struggling and falls in cattle during transit and falls have been shown to be less common at lower stocking densities (Tarrant et al., 1989, 1992; Jones et al., 2010). Tarrant and Grandin (2000) stated that the degree of care that the driver displays while driving appears to be more important in determining transport stress than the distance travelled. NAWAC has stated within the Code that drivers, in particular commercial drivers, are required to adopt careful driving techniques.

**Other issues considered by NAWAC**

27. NAWAC has considered how the Code aligns with other relevant codes and regulations both in New Zealand and internationally. NAWAC is not aware of any examples where the Code deviates significantly from these documents.

**The nature of any significant differences**

28. All significant differences of opinion about the Code, or any of its provisions, have been set out above or in NAWAC's response to submissions.

**Dr John Hellström**

Chair, National Animal Welfare Advisory Committee

8 April 2011

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