WELFARE INDICATORS FOR ZOO DORCAS GAZELLES (*GAZELLA DORCAS*)

INTRODUCTION AND OBJECTIVES OF THIS REPORT

The international zoo community recognizes animal welfare as a key element for proper husbandry and conservation of wild animals in captivity. However, the paucity of scientific knowledge on zoo animal welfare severely hinders the development and evaluation of animal welfare improvement strategies. In dealing with animal welfare, animal caretakers, curators and veterinarians must therefore resort to subjective criteria, mostly variations on the analogy principle, for lack of validated, objective criteria. Although subjective criteria may be helpful as a starting point in some instances and on a local scale, their use is prone to severe pitfalls and cannot be standardized or extended among facilities or institutions.

We propose to build on the framework for the objective assessment of animal welfare in farm animals provided by the Welfare Quality® project, and extend it to zoo animals. This report identifies science-based indicators to quantify each element of welfare in dorcas gazelles (Gazella dorcas). It also singles out indicators which, despite generalized consensus among professionals regarding their importance, currently lack sufficient scientific evidence to adequately quantify them.

Animal welfare can be defined in a number of different ways, but there is a growing consensus that whatever the definition, it has to include three elements: the emotional state of the animal, its biological functioning and its ability to show normal patterns of behaviour (Duncan and Fraser, 1997; Mendl, 2001). Indeed, it is now widely accepted that an animal's welfare embraces its physical and mental state and that good animal welfare implies both fitness and a sense of well-being. The Five Freedoms developed by the Farm Animal Welfare Council of the UK provided a very useful framework to assess these principles in practice. These freedoms, which represent ideal states rather than actual standards for animal welfare, include: freedom from hunger and thirst, freedom from discomfort, freedom from pain, injury and disease, freedom to express normal behaviour, and freedom from fear and distress (FAWC, 1992). More recently, the Welfare Quality® project built on and extended the Five Freedoms to four principles of animal welfare: good feeding, good housing, good health and appropriate behaviour. Each of these four principles comprises several criteria, with an overall total of 12 criteria (Botreau et al, 2007). Finally, each criterion is assessed through a number of parameters which has been tested for validity, reliability and feasibility, and that are mostly animal-based indicators.

The objective of this report is to suggest a list of indicators to assess welfare in captive dorcas gazelles. The report provides a list of animal-based and resource-based indicators grouped according to the four principles of the Welfare Quality® protocol. Animal based indicators may offer advantages over resource based indicators; for example, they should be equally applicable across a wide range of housing conditions. On the other hand, however, there is a number of welfare issues for which no adequate animal-based indicators is available. Furthermore, although animal-based indicators may be the best option to assess welfare, resource-based indicators are still needed to select improvement strategies. Therefore, a combination of both types of indicators is warranted. For each indicator, its rationale (e.g. why the indicator has been included in the protocol), its problems and limitations, and the suggested methodology to record it (when applicable) are included. At the end of each indicator, a conclusion is given.

LIMITATIONS OF THE REPORT AND AREAS DESERVING FURTHER RESEARCH

This report is not intended to provide an overall absolute score for gazelle welfare in a given facility. This is due to the fact that adding up scores for different welfare elements is very difficult, as there is no common currency for all welfare problems. For example, there is no science-based criterion to decide whether animal welfare is more compromised by lameness or by the lack of social contact. Therefore, the aim of this report is to provide a set of indicators to identify problem areas in a given facility and monitor progress once improvement strategies have been applied.

As it is also the case in protocols developed for farm animals, this report includes mainly negative indicators, e.g. indicators of poor welfare. Clearly, identifying positive indicators is an area deserving further research.

Some potentially important indicators have not been validated in dorcas gazelles. For example, although there are many recommendations on the size of the enclosures, the rationale behind the recommendations is not clear and they seem to be based more on current practice than on good scientific evidence. Validating possible indicators of welfare (particularly in regards to animal-based indicators) is another area that needs urgent attention.

GOOD FEEDING

Body condition (animal-based)

Rationale

Body condition is included as animal-based indicator in several protocols to assess welfare in zoo animals. Both poor body condition and excessive body condition are indicative of a welfare problem. Excessive body condition may increase the risk of lameness and other conditions. Additionally, it may be a consequence of lack of physical exercise.

Problems and limitations

No body condition scale has been developed for Dorcas gazelle.

Methodological considerations

Body condition must be assessed by an experienced person at regular intervals.

Conclusion: poor or excessive body condition should be considered indicative of a welfare problem.

Water provision (resource-based)

Rationale

Ad libitum access to good quality water is considered a welfare requirement for all species and several welfare assessment protocols for farm animals include provision of water as a resource-based indicator. Gazelles should have access to drinking water area and troughs should be cleaned daily.

Problems and limitations

Ideally, water consumption should be monitored but this may be difficult in practice.

Methodological considerations

None.

Conclusion: Ad libitum accesses to good quality water as well as clean troughs are welfare requisites.

GOOD HOUSING

Enclosure size – outdoors / indoors (resource-based)

Rationale

Dorcas gazelles are found in a variety of habitats in the wild and can move fairly long distances depending on which habitat they live (Lawes and Nanni, 1993). Evidence in many species show that animals kept in small enclosures are more likely to develop physiological and behavioural changes indicative of poor welfare than animals kept in larger enclosures.

Problems and limitations

Although the amount space available to the animals is important, the quality of the space (e.g. whether there is any sort of environmental enrichment) is likely to be even more important. Recommendations on the minimum space per animal are very diverse and the rationale for such recommendations is not clear.

Methodological considerations

None.

Conclusion: although enclosure size is likely to have an important effect on welfare of captive gazelles, at present there is no science-based recommendation on optimal enclosure size.

Climatic conditions (resource-based)

Rationale

Even though Dorcas gazelles are the most widespread of the gazelle species in the wild, in zoos they are often kept in climates that are very different from those of their current areas of natural distribution. On the other hand, however, it seems that gazelles can adapt to a diversity of climates. Nevertheless, wet and muddy conditions are likely to compromise welfare, as they may increase the risk of feet conditions, for example. Very high temperatures may cause heat stress and sunburn if animals do not have access to shade.

Problems and limitations

At present there is no precise information on the rage of temperatures that is adequate for Dorcas gazelles and it is very likely that factors such as age and previous acclimatisation have a significant effect of the animals' tolerance to high and low temperatures.

Methodological considerations

None.

Conclusion: damp and muddy conditions should be considered as a welfare problem and the same applies to absence of shade in hot climates.

GOOD HEALTH

Lameness (animal-based)

Rationale

Hoof problems are really common in Artiodactylids (Boever, 1986) and these and others feet conditions can lead to lameness easily. In farm animals, lameness is considered a major welfare problem as it is indicative of pain and may interfere with normal behaviour.

Problems and limitations

None.

Methodological considerations

Feet condition and lameness must be assessed by an experienced veterinarian at regular times.

Conclusion: lameness and other feet conditions should be considered indicative of a welfare problem.

Integument alterations (animal-based)

Rationale

Integument alterations as hairless patches and lesions or swellings have been observed in captive gazelles and may be a consequence of disease, rough handling or intraspecific aggression, or inappropriate physical environment. In farm animals, presence of injuries on the integument is commonly used as indicator of poor welfare.

Problems and limitations

None.

Methodological considerations

Integument condition must be assessed by an experienced veterinarian at regular times.

Conclusion: poor integument condition should be considered indicative of a welfare problem.

Absence of disease (animal-based)

Rationale

Certain symptoms as nasal and ocular discharge, hampered respiration or diarrhoea may be a consequence of gastrointestinal and respiratory affections or diseases. In farm animals, presence of disease or specific symptomatology is commonly used as indicator of poor welfare.

Problems and limitations

None.

Methodological considerations

Presence of diseases must be assessed by an experienced veterinarian at regular times.

Conclusion: presence of disease should be considered indicative of a welfare problem.

APPROPRIATE BEHAVIOUR

EXPRESSION OF SOCIAL BEHAVIOUR

Affiliative behaviours (animal-based)

Rationale

Studies in several species have shown that affiliative behaviours are self-rewarding. Additionally, they may have a buffering effect on stress.

Problems and limitations

Studies in domestic cattle have shown that social grooming (which is a form of affiliative behaviour) may increase after stressful events.

Methodological considerations

Affiliative behaviours may be subtle and of short duration and therefore behavioural observations using continuous recording should be carried out by experienced observers.

Conclusion: the presence of affiliative behaviours should be considered indicative of positive welfare.

Intra-specific aggression (animal-based)

Rationale

Intra-specific aggression may lead to injuries and social stress and has been included in several protocols to assess welfare in farm animals. According to López and Abáigar (2013), adult males of Dorcas gazelles usually present high levels of aggression, most of all when another male is trying to court a female. Also is usual that a reproductive male attacks the other males when he is moved from a reproductive group to a bachelor group.

Problems and limitations

Some degree of intra-specific aggression may be normal or even unavoidable. Therefore, only "excessive" aggression should be indicative of poor welfare and currently there is no definition of "excessive" intraspecific aggression in Dorcas gazelles.

Methodological considerations

Aggression may be subtle and of short duration and therefore, behavioural observations using continuous recording should be carried out by experienced observers. Particular attention should be given to periods when animals are confined or when there is potential for resource competition.

Conclusion: despite the problems and limitations already mentioned, we believe that stable groups of Dorcas gazelles, particularly females, should show very limited amounts, if any, of overt aggression. Therefore, presence of overt aggression should be considered an indicator of poor welfare. Frequent threats between animals should also be considered an indicator of poor welfare.

Group size and composition (resource-based)

Rationale

Dorcas gazelles are known to have a complex and habitat related social organisation. The different social structures are largely a consequence of the availability and distribution of food resources: Dorcas gazelle group size increases with increased forage quality (Grettenberger, 1987; Lawes and Nanni, 1993). Four different situations have been seen in the wild: harem-like structure (social units with one male accompanied by 1-5 females), satellite groups of immature males, female herds unaccompanied by males and male pairs. In zoos, trying to imitate the wild group composition, animals are usually kept in three groups: females and young animals together with only one reproductive male; bachelor group of males; and isolated males (they usually were the reproductive males of a harem).

There is ample evidence in many species showing that social contact is necessary for good welfare in group-living animals. In domestic social species, being kept in group is considered as a requisite for good welfare.

Problems and limitations

There not exist recommendations on the minimum acceptable group size in captive Dorcas gazelles. Group size is not the only factor to consider when assessing animal welfare, as group compositions and the compatibility between individual animals are also important.

Methodological considerations

None.

Conclusion (I) – Female and young animals: keeping female or young Dorcas gazelles alone is not acceptable on welfare grounds, considering that they are never alone in the wild. However, at present, there is no scientific rationale to suggest a minimum group size.
Conclusion (II) – Adult males: it is usual in zoos to keep adult Dorcas gazelle males alone whether there are aggressive behaviours in a group. Although, in general, a housing system that prevents social individuals from having visual, auditory and olfactory contact with conspecifics should be considered as indicative of a welfare problem, these cases might be an exception.
Conclusion (III) – Bachelor groups: at present, there is no scientific rationale to suggest a minimum group size. However, keeping these animals alone without visual, auditory and olfactory contact with conspecifics should be considered as indicative of a welfare problem.

EXPRESSION OF OTHER BEHAVIOURS

Stereotypies (animal-based)

Rationale

Traditionally, stereotypies have been defined as behaviours that are repetitive, invariable, and without any apparent function. More recently, Rushen and Mason (2006) have described them as repetitive behaviours resulting from illness or repeated attempts at adapting to a difficult environment. In general, stereotypies are considered to be indicators of a lack of welfare. This is due to both the circumstances that favour their development, such as restrictive environments that prevent the expression of normal species specific behaviour, and the fact that some stereotypies have negative consequences for the animal, causing injury or loss of body condition (Mason, 1993).
Although stereotypies are not widely reported in Dorcas gazelle, ungulates are particularly at risk of developing oral stereotypies in captivity (Hosey et al, 2009). In fact, repetitive, seemingly functionless oral and oro-nasal activities (e.g. object-licking, dirt-liking, tongue-rolling…) are prevalent in captive ungulates (Bergeron et al, 2006).

Problems and limitations

The relationship between stereotypies and individual welfare is complex, as stereotypies may persist even after the environment in which the animal is kept has been considerably improved. Therefore, the performance of stereotypies must not be taken as a definitive sign that current conditions are sub-optimal.

Methodological considerations

To assess whether an animal is performing stereotypies it is necessary to carry out behavioural observations at different times, including

the period when gazelles are kept indoors.

Conclusion: if a captive gazelle starts displaying stereotypies when kept in its current environment, this environment should be considered sub-optimal.

Environmental enrichment (resource-based)

Rationale

Environmental enrichment has been shown to have positive effects on welfare in a variety of species. Dorcas gazelles in the wild use different kinds of trees with different purposes. Larger Acacia trees are used for territorial purposes because gazelles use middens (or dung piles) for activities related to territory maintenance, advertisement, and olfactory communication. Larger trees also provide more shade, another food source (such as seed pods) and cover from predators than smaller trees. However, gazelles can graze on leafy vegetation on shorter trees. The loss of large trees in the wild may indirectly affect social behaviour of Dorcas gazelles because animals are losing conspicuous landmarks that could be used for midden sites (Attum and Mahmoud, 2012). Also, it has to be noticed that Dorcas gazelles in the wild spend much of their total time foraging and browsing.

Problems and limitations

None.

Methodological considerations

None.

Conclusion: although Dorcas gazelles opportunistically, given the rarity of vegetation during the dry season, utilize any tree regardless of size, having trees of different species and size should be considered a requisite for good welfare. Also browse should be provided.

HUMAN-ANIMAL RELATIONSHIP

Medical training (resource-based)

Rationale

If properly done, medical training is likely to reduce the stress caused by veterinary procedures. Additionally, there is evidence in other species showing that training based on positive reinforcement as opposed to punishment has positive effects on welfare and can be considered as a form of environmental enrichment.

Problems and limitations

Poor training techniques (e.g. training based on punishment or carried out by inexperienced personnel) have negative effects on welfare. Therefore, the implementation of medical training programmes per se is not necessarily good for the welfare of gazelles, as the effects of training will depend on its quality.

Methodological considerations

None.

Conclusion: implementation of medical training programmes based on positive reinforcement should be considered as an indicator of good welfare. Training programmes based on punishment or carried out by inexperienced personnel should be considered as a welfare problem.

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