1. INTRODUCTION & OBJECTIVES

This review studies the reality of marine mammals in captivity, achieving the following objectives:

- To understand the concept of animal welfare in zoos as well as the level of cognition of cetaceans
- To meet the main problems marine mammals kept in captivity and their improvement strategies.

2. PREFACE

2.1. ANIMAL WELFARE CONCEPT

Concept which includes aspects of physical health of the animal, as well as its emotional state and behaviour.

2.2 MAIN PROBLEMS OF CAPTIVE WILD ANIMALS WELFARE

Failure in adaptability to captivity

<table>
<thead>
<tr>
<th>Species</th>
<th>Failure reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon river dolphins (Inia geoffrensis)*</td>
<td>Aggression among group members</td>
</tr>
<tr>
<td>Yangtze river dolphins (Lipotes vexillifer)*</td>
<td>Very susceptible to stress in captivity</td>
</tr>
<tr>
<td>Fraser's dolphin (Lagenodelphis hosei)*</td>
<td>Very susceptible to stress in captivity</td>
</tr>
<tr>
<td>Dall's porpoise (Phocoenoides dalli)*</td>
<td>Very susceptible to stress in captivity</td>
</tr>
<tr>
<td>Walrus (Odobenus rosmarus)</td>
<td>Often express oral stereotypies</td>
</tr>
<tr>
<td>Bottlenose dolphin (Tursiops truncatus)</td>
<td>Dental problems</td>
</tr>
</tbody>
</table>

* Species that are not kept in captivity

2.3. CETACEANS BRAIN AND COGNITION

- Several areas of research show that the brain of cetaceans suffered a neocortex expansion during its evolution.
- Cetaceans are an example of convergent evolution of cognition in response to social demands to which the species was exposed to.

3. PROBLEMS & IMPROVEMENT STRATEGIES

3.1. SOCIAL INTERACTIONS AND RELATIONSHIPS

Given this species social nature, its main psychological stressors are those that are related with members of their group.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition for food</td>
<td>Feeding behaviour*</td>
</tr>
<tr>
<td>Changes in social relationships</td>
<td>Group cohesion*</td>
</tr>
<tr>
<td>Perception of threats</td>
<td>Dominance relationships*</td>
</tr>
</tbody>
</table>

* Behavior monitoring

3.2. ANTHROPOGENIC PRESENCE

Effects of anthropogenic presence on marine mammals:

- Aggressive responses of animals
- Reduction in the frequency of normal behaviors
- Escape behavior in “swim-with-a-dolphin” programs
- Alteration of the maternal behavior of gray seals

Improvement strategies:

✓ Interactions between cetaceans and humans, under specialized supervision.

3.3. NOISE ON MARINE MAMMALS

Effects of noise on marine mammals:

- Cardiac responses
- Modification of the frequency and duration of their calls
- Different effects depending on age, sex and reproductive states of the animals
- In the wild they show escape behavior

Improvement strategies:

✓ Further investigations are needed to know more exactly the effects of exposure to sound

4. CONCLUSION

- Understand the nature of the species to know their basic needs.
- Because marine mammals are very social animals, studies should be done of each animal’s normal conduct before groups are made.

Future trends in action

Future legislation should work strictly to avoid catching wild species, not just those that are endangered, but also those currently kept in captivity.

Future research studies should be carried out in order to reach significant conclusions and thus ensure the improvement of animal welfare in cetaceans captivity programs.

Follow the example of other countries such as Switzerland, Norway and the United Kingdom, and forbid dolphinariums.


http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.0050139

Neocortex expansion of cetacean species. A: bottlenose dolphin; B: Humpback Whale