

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

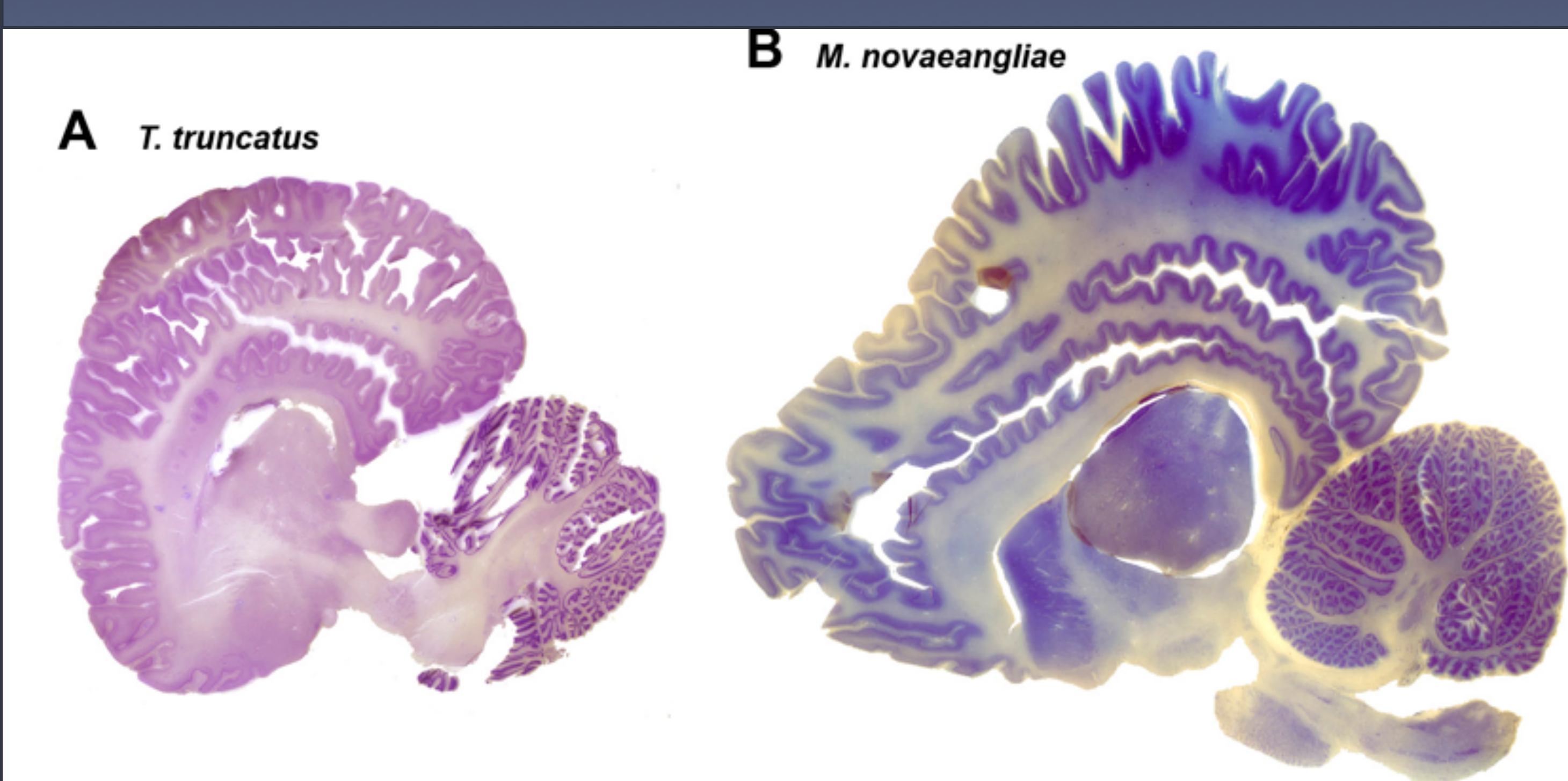
Failure in adaptability to captivity

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

* 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.



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

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

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.

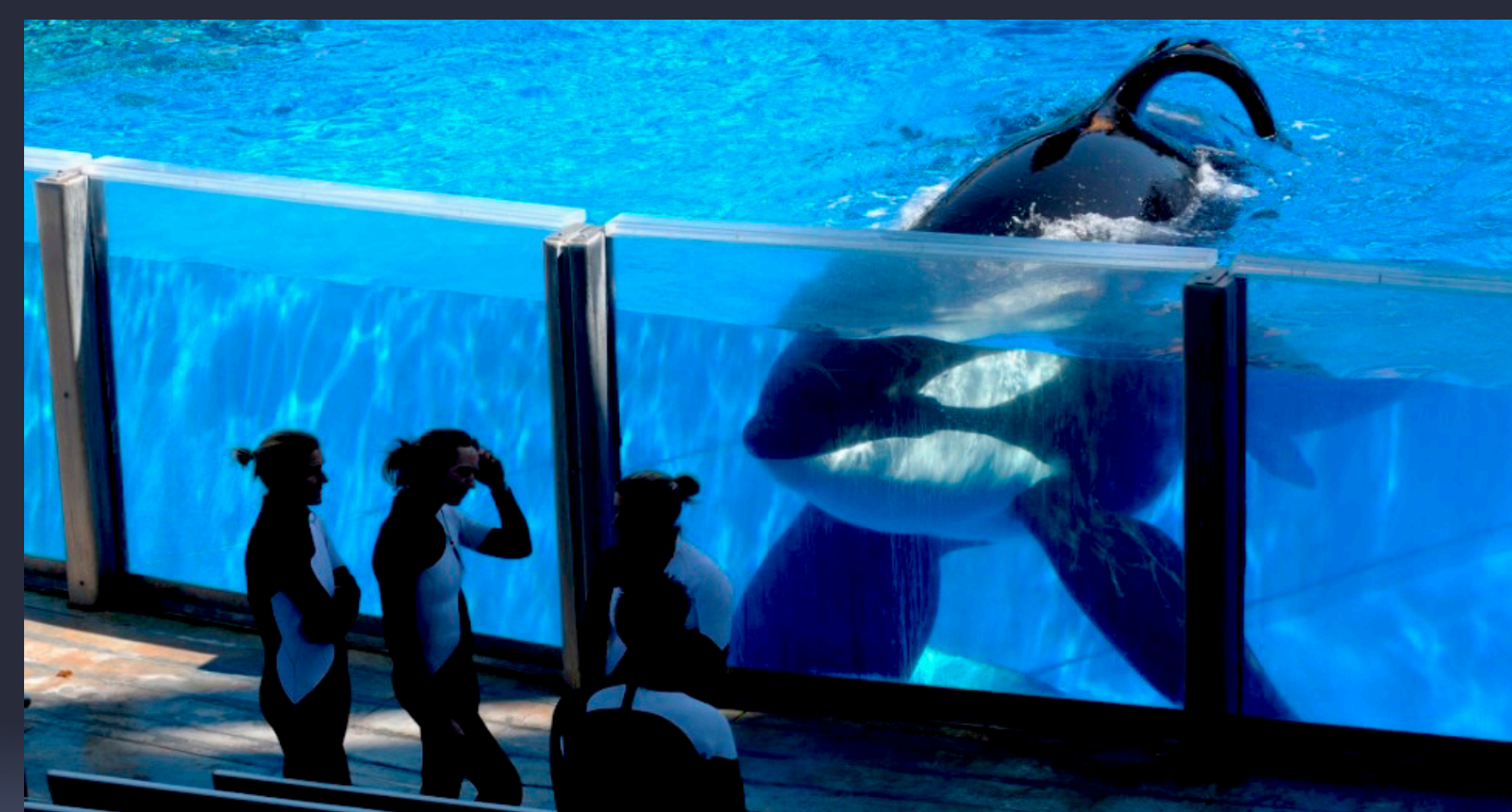
Problem	Strategy
Competition for food	Feeding behaviour*
Changes in social relationships	Group cohesion* Make similar groups to those in the wild
Perception of threats	Dominance relationships* Proper design of the pools

* 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



<http://news.nationalgeographic.com/2016/03/160310-tilikum-killer-whale-orca-death-seaworld-sick-dying/>

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**