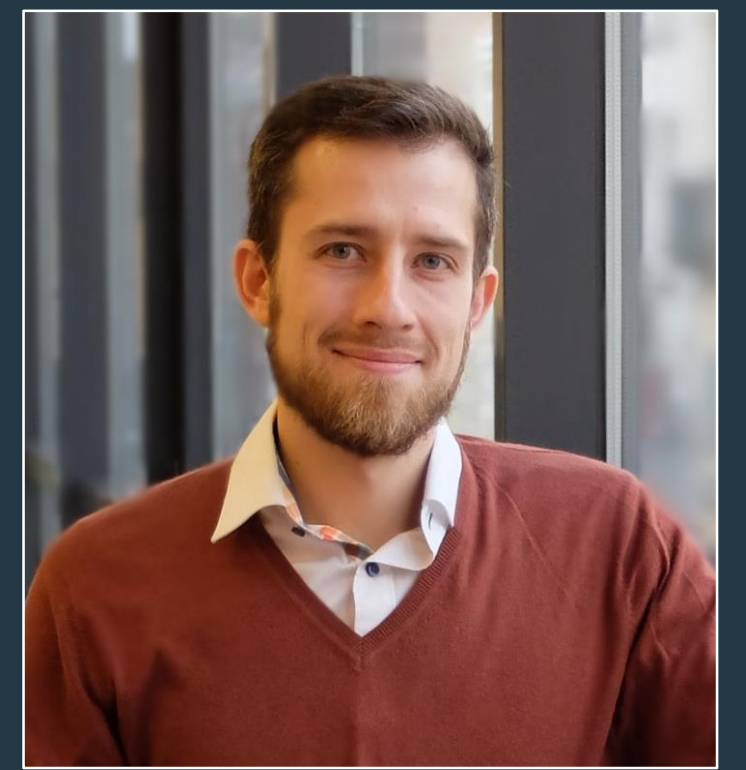


DATA DEFICIENT! A REVIEW OF ZOO RECORD-KEEPING FOR CAPTIVE BOTTLENOSE DOLPHINS IN GERMANY

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INTRODUCTION AND METHODOLOGY

In 2006 – 2007, six common bottlenose dolphins (*Tursiops truncatus*) died at Tiergarten Nürnberg (TgN), a zoo in Nuremberg, Germany. In order to conduct an independent investigation into why the dolphins had died, Whale and Dolphin Conservation obtained access to 18 years of husbandry and veterinary records of 25 *Tursiops truncatus* held at the zoo between 1989 – 1991 and 2000 – 2014 through a freedom of information request upheld by the Bavarian Administrative Court. A review of the records was carried out with the aim of drawing conclusions about the quality of recording and any resultant impact on the health and welfare of the dolphins.

The majority of the records reviewed were comprised of observations of dolphin behaviour made by husbandry staff working at the zoo and information recorded by veterinarians that related to the dolphins' health and the administration of medical treatment.

RESULTS AND DISCUSSION

Quality of records

Records weren't made on a daily basis or in a consistent fashion. The information in the records was not standardised. It changed in format over the study period, including between consecutive days and between different records on a similar subject about the same dolphin. Scientific analysis of the data was, therefore, not possible.

No precise description was found of any dolphin's behaviour at any one time which would have enabled an accurate analysis of what was happening. The descriptions of behaviour were the recorder's subjective interpretation of what a dolphin was actually doing, with the context of the observed behaviour often missing from the records. The records were presented without reference to circumstances that had happened before. For

example, it was not possible to compare a record such as "collaborates better than the day before" with a record for the day before as it did not exist. Records were imprecise, even for seemingly simple to measure activities such as food consumption. For example, "ate a little bit, in the afternoon nothing", was recorded without the amount of food consumed being specified or reference made to what the dolphin's usual daily food intake might be. A record written in this way, without further explanation, appeared to have no useful purpose to other staff working with the dolphins wishing to know how well or poorly a dolphin was feeding, especially if they were new to the team, had experienced a period of absence or were external inspectors.

Aggressive behaviour

The records document many accounts of aggressive behaviour and injuries to dolphins including broken jaws, broken teeth, a pectoral fin wound, an injured eye, scars and a haematoma. Trainers were also the victims of injurious behaviour by the dolphins. Aggression between male dolphins is common in the wild and in captivity [5, 8, 13, 18]. In the wild, however, individuals are able to move away from aggressive situations and avoid certain individuals or groups [10]. This is much more difficult in the captive environment where there is no physical means of escape.

Transfers

Thirteen dolphins were transferred in or out of TgN during the study period [4]. Transport is a stressful process for dolphins, involving their removal from the water, placement in a sling and transport box and the travel itself, sometimes over many hours, increasing their risk of mortality [12, 16]. The transport preparation, the transport itself and any follow-up monitoring of dolphins to and from TgN was in most cases poorly documented.

CONCLUSION

Our review of the records from an 18 year period of bottlenose dolphin husbandry and veterinary care at Tiergarten Nürnberg, Germany demonstrates a non-uniform, inconsistent, anecdotal documentation of complex, intelligent individuals from a species hard to care for and maintain in captivity [11, 15–18]. The lack of attention to detail and follow-up surrounding records of behaviour, medical treatment, pregnancy and transport to other facilities give rise to concerns about how well the dolphins were understood and cared for. More alarmingly, this causes us to question whether

Calf mortality

During the study period, eight calves were born at TgN (see Table 1). Six calves lived only a very short period of time; in the case of three, less than one day. The records demonstrate how difficult it is to breed and maintain dolphin calves in captivity. Reference is made to aggressive behaviour demonstrated towards calves by their mothers or other dolphins, to "hand rearing" when there are nursing difficulties, and to necropsy reports detailing trauma, pneumonia and starvation, among other things. The records also include an account of the death of adult dolphin Daisy, from a rupture of her uterus during the birth of her still-born calf. Calf mortality is a known problem in captivity. EAZA's 2007/2008 Yearbook [6] noted: "neonatal mortality remains a serious problem for the whole European bottle-nosed dolphin population". TgN itself admits that "high neonatal mortality may be correlated with missing early intervention procedures or inexperienced mothers" [9].

Table 1: Calves born at TgN during the study period and their current status.

Name	Date of birth	Status - Alive / Dead (days alive*)
Nando	06/06/1990	Alive
"Calf 1"	28/07/2004	Dead (31)
"Calf 2"	18/03/2005	Dead (8)
"Calf 3"	18/05/2006	Dead (1)
"Calf 4"	23/06/2006	Dead (1)
"Calf 5"	07/06/2007	Dead (4)
"Calf 6"	25/06/2007	Dead (1)
Nami	31/10/2014	Alive

*For the number of days each calf lived, we rounded up to the nearest day. So (1) means a calf survived less than one day, (4) between 3 and 4 days and so on.

poor record-keeping contributed to the myriad of accounts of poor health, aggression and other behavioural problems and, ultimately, death of dolphin individuals at TgN. This also raises serious questions about the ability of the zoo to comply with the requirements of the EU's Zoo Directive, including "keeping of up-to-date records of the zoo's collection appropriate to the species recorded" and legislation implementing it in Germany [1, 3]. A good monitoring programme enables a rapid response to any signs of stress, sickness or injury and, according to the European Commission (2015) [2] "prevents more serious problems

Administration of drugs

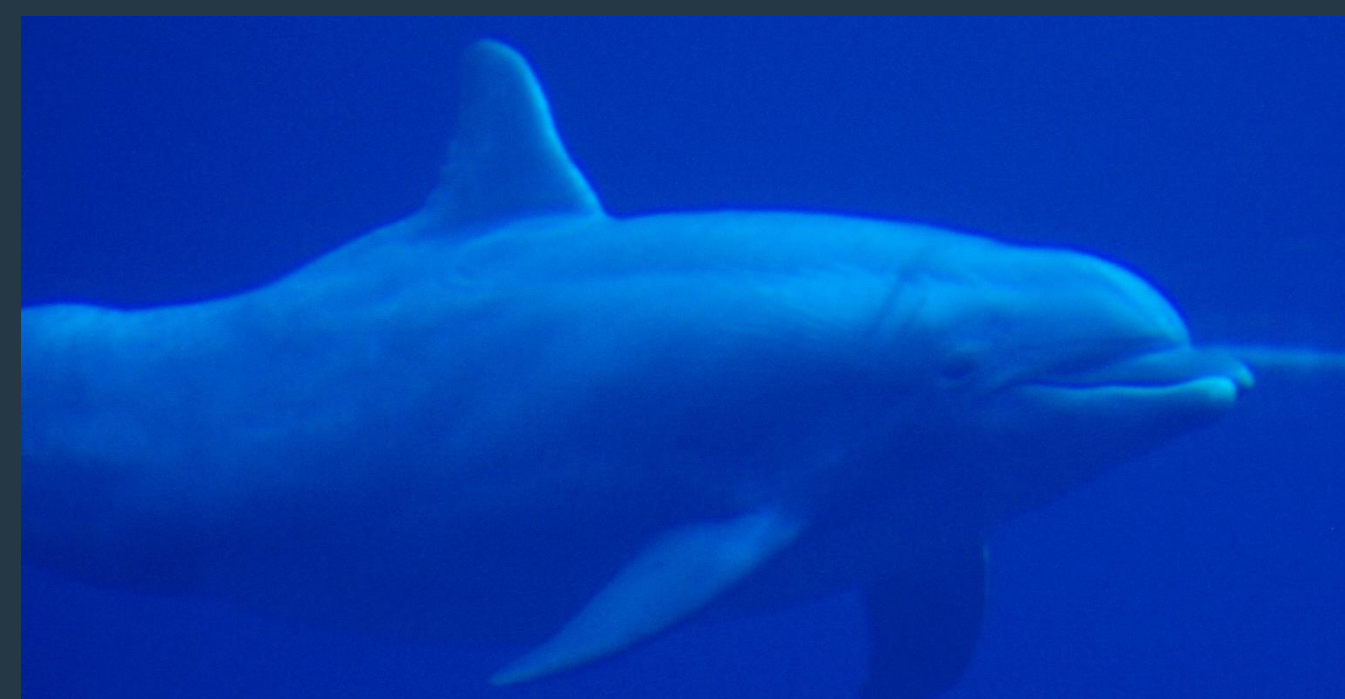
A number of different drugs were administered to the dolphins (see Table 2). The records often lacked information about the period of time for which the medication was given and about the dose. Comments included "the same as the day before", but no dosage was recorded the day before. The majority of records about medication did not specify the reason for it being given. A number of dolphins were receiving more than one type of medication at any one time.

Diazepam was the drug most regularly administered to the dolphins and is typically used to induce calming or to stimulate appetite [7]. Reference to Diazepam appeared often in records related to stress, noise, transport, feeding behaviour and aggression between the dolphins. It was not always clear whether Diazepam was administered to address appetite stimulation or "calming".

Table 2: A number of different types of treatment were administered to the dolphins. They have been clustered into different groups based on their active (pharmaceutical) ingredient

Type of treatment	Number of times a type of treatment was used during the study period
Diazepam	618
Antifungal agents (e.g. Nystatin)	364
Specified antibiotics (e.g. Baytril)	301
Hormones (e.g. Megastat)	143
Broad-spectrum antibiotics (e.g. Amoxicillin)	85
Gastro-intestinal agents (e.g. Gelusil)	83
Vaccines (e.g. Broncho-Vaxom)	46
Others (e.g. camomile tea)	44
Analgesics (e.g. Aspirin)	37
Dermatological drugs (e.g. Tavegil)	30
Drugs to regulate reproduction and aid birth (e.g. Regumate)	26
Vitamin and dietary supplements (e.g. Cytobion)	36
Respiratory agents (e.g. Gelomyrtol forte)	12
Homeopathic products (e.g. Selenit-E)	5
Wound healing agents (e.g. Actovegin forte)	7
Gastro-intestinal agent / dermatological drug (e.g. paraffin oil)	6
Emergency drug (Adrenalin)	1

developing". Scientific evidence already strongly supports a number of concerns relating to mental and physical health among captive cetaceans such as bottlenose dolphins, all of which have a potentially negative impact on an individual's welfare or wellbeing and, ultimately, health and mortality [14, 17–19]. This highlights an even greater need to very carefully care for any cetaceans still in captivity, ideally in whale and dolphin sanctuaries.



Dolphin at Tiergarten Nürnberg

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