SEASONAL CHANGES IN MORTALITY OF CAPTIVE ARTIODACTYLA POPULATIONS IN A DESERT ENVIRONMENT

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Abstract

The goal of most zoological institutions is to achieve self-sustaining populations in captivity. For a considerable breeding success, optimal husbandry conditions are necessary. Seasonal mortality can be used to recognize trends and problems of adaptation to the local environment and initiate subsequent improvements in housing of the animals.

As an example of monitoring seasonal changes in mortality of zoo populations, data of different Artiodactyla species at Al Wabra Wildlife Preservation (AWWP) in Qatar were evaluated. 1500 medical records were investigated covering the time period from 2003 - 2008. To minimize potential bias due to high newborn mortality, animals that died until the age of ten days were excluded. Two different datasets served as the basis of this investigation: a) individual animal records, which indicate the date of death of each animal, and b) medical records of the veterinary staff that indicate the number of acute patients. Due to the extreme climatic conditions in the desert, an increased mortality rate during the hot summer months was expected (WILSON and KRAUSMAN, 2008). The aim of this study was to investigate the magnitude of this effect and to evaluate whether additional special precautions to provide protection from climatic influences are necessary.

Contrary to the expectation, mortality was not higher during the summer. Instead mortality increased during the winter and was highest in March (Fig. 1). The number of deaths in which pneumonia was diagnosed at gross necropsy followed a less distinct but similar pattern, with more cases from winter to early summer, and less cases as summer progressed (Fig. 1). Showing a similar trend, the number of acute patients was highest in February and March (Fig. 2).

At the end of the winter period animals increasingly got sick and eventually died. Possible reasons for these findings are debilitation due to the lower temperatures and the higher humidity in Qatar in wintertime (WORLD METEOROLOGICAL ORGANIZATION, 2010). In humans there is a positive correlation between high humidity, lower temperatures and death from pneumonia (BULL, 1980) and in Pronghorn Antelopes *(Antilocapra americana)* cold weather conditions especially with deprivation of drinking water can cause severe stress in the wild (RICHARDSON, 2003). Also giraffes *(Giraffa camelopardalis)* in South Africa had a high mortality after a period of cold and wet weather (WALKER et al., 1987). However, the mean daily minimal temperatures in Qatar in January and February range around 13° Celsius (WORLD METEOROLOGICAL ORGANIZATION, 2010). In summer, the hot weather conditions may have led to a reduced number of veterinary interventions to prevent stress for

the rest of the group. For this reason the number of acute cases could have been reduced artificially in summer. Nevertheless, the number of deaths – the more 'objective' parameter - was also reduced.

Another environmental factor that might cause lung disease in humans is sand dust in the air due to desert storms (KORÉNY-BOTH et al., 1992). In Qatar the incidence of dust events is highest from March to May, with the smallest chance of dust storms in October (BARTLETT, 2004). Together with temperatures, wind conditions might thus have led to the increase of pneumonia-associated deaths from March to June and to the smallest incidence of pneumonia in October (Fig. 1). The climatic factors might have weakened the overall condition of the animals and therefore promoted fatal infectious diseases. Therefore, additional shelters to protect from the wind and cool weather rather than protective measures against sun and high temperatures would appear most appropriate and promising at this facility.

This study indicates that evaluating population data is an important tool to reveal unexpected climatic influences affecting animal health. Additionally, evaluation of medical records and necropsy data is useful to measure the success of treatment strategies as well as treatment regimes.

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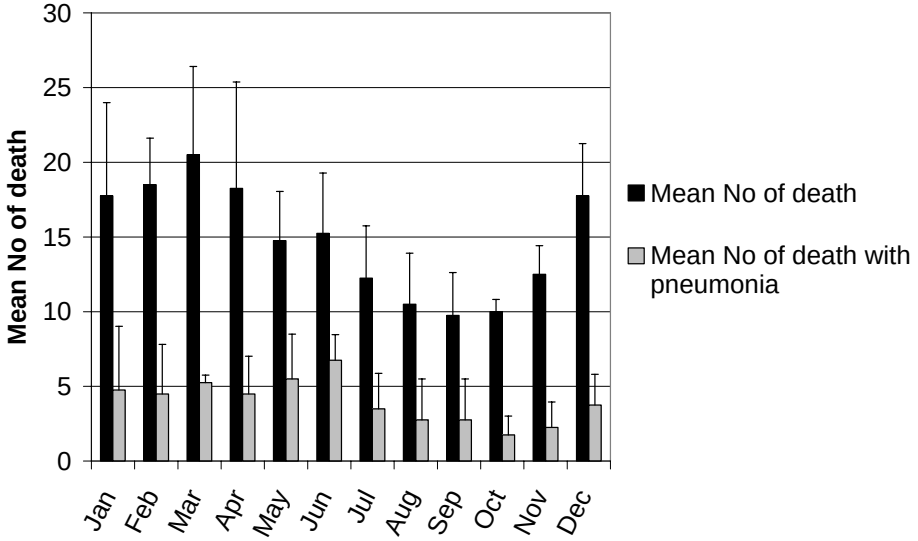

Fig. 1: Mean number of deaths and death due to pneumonia (n + SD) of selected Artiodactyls at Al Wabra Wildlife Preservation from 2003-2008. Note the increase of deaths from December to March and the decreased incidence of pneumonia from July to November.

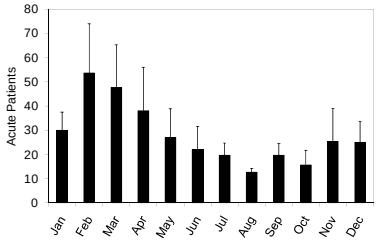

Fig. 2: Mean number of acute patients (selected Artiodactyla species) at Al Wabra Wildlife Preservation according to months between 2003 and 2008 (n + SD). Note the increase in February and March.