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ENVIRONMENTAL STRESS AND ANTLER DEVELOPMENT IN CAPTIVE ROE DEER (*Capreolus capreolus*) – FOUR CASE REPORTS

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Antler size is a decisive factor for the popularity of deer, both as hunting trophies and as display animals. Antler development is primarily determined by genetic factors but can be modulated by nutrition as well as the endocrinologic status of the animal. While testosterone is the hormone mainly responsible for the antler cycle, with peak testosterone levels coinciding with velvet shedding, and with testosterone decline coinciding with antler casting, other hormones, including cortisol, also influence antler development (Bubenik and Bubenik, 1990). As cortisol increases in animals in reaction to environmental stress, antler size could be hypothesized to reflect the level of environmental stress an animal had been exposed to, if series of shed antlers of the same individual are investigated.

Here, we report antler weights of four roe deer bucks from a private facility. For these animals, a complete antler record was available. All animals had been kept on a constant dietary regime throughout the period reported, and group composition had remained stable as far as the number of male and female animals were concerned. The four bucks (Fig. 1) had been kept in enclosures of app. 1000-2000m² in groups of 3-6 animals. Visual contact to the outside was prevented by solid wooden walls, but acoustic contact to the surroundings was not impeded. In 1990, a house was built on a neighbouring property next to the enclosure of buck 1. In 2001, a public street was built next to the enclosures of bucks 2-4. Both building procedures were accompanied by a lot of irregular activity and noise. In all cases, the antlers produced following the potential stressor were of a lower weight than the preceding sets. Buck 1 achieved similar antler weights as during his 4th year when he was 9 and 10 years old. In 2003, buck 4 and his group were given access to an additional enclosure, doubling the area available for this group. The next antlers produced by this buck were distinctively larger than his previous sets.

These findings suggest that environmental stress can have an important influence on antler development in captive roe deer. We predict stressed roe deer to produce smaller, and less-stressed roe deer larger antler sets. Antler cast series, which are easy to obtain in captivity, therefore represent a useful tool for *a posteriori* evaluation of husbandry conditions.

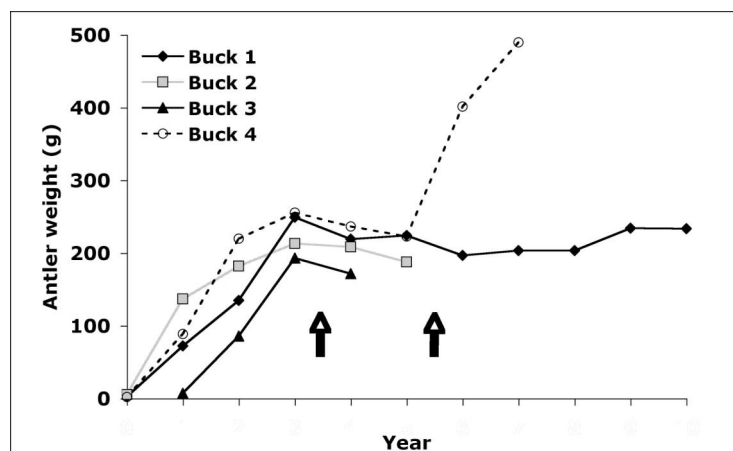


Fig. 1. Weight of cast antlers of four roe deer bucks in subsequent years. Lifespan: buck 1 (1986-1997), buck 2(1997-2003), buck 3 (1998-2002), buck 4 (1997-present). The left arrow indicates a period of environmental stress (building activities next to the enclosures) in 1990 (buck 1) and 2001 (buck 2-4), respectively. The right arrow indicates a doubling of the enclosure size for the group of buck 4.

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