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## **Summertime use of natural versus artificial shelter by cattle in nature reserves**

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### **Abstract**

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*Whether cattle grazing in nature reserves in temperate summers ought to be provided with artificial shelter (man-made), in addition to natural shelter (vegetation), is a topic of debate. We have investigated the effect of heat-load on the use of natural versus artificial shelter (with a roof and three walls) by cattle in eight nature reserves in Belgium. GPS collars were used to monitor use of open area, natural and artificial shelter during one or two summers (per 30 min). Cattle location data were coupled to same-time values of climatic 'heat-stress indices' calculated from local weather stations' measurements of air temperature, air humidity, solar radiation and wind speed. Use of open area decreased as heat-load increased. The strength of the effect, and whether the cattle sought natural or artificial shelter, were associated with the amount and spatial distribution of natural shelter in the reserve. When natural shelter was sparse, a more scattered distribution tempered the increased use of shelter with increasing heat-load. If sufficiently available, cattle preferred natural to artificial shelter. When little natural shelter was available, cattle did use the artificial shelter and especially so with increasing heat-load. Microclimatic measurements indicated that solar radiation was blocked by vegetation at least as well as by artificial shelter, and allowed more evaporative cooling. In conclusion, we found no evidence for the added value of additional artificial shelter to protect cattle from heat-load in temperate nature reserves, as long as adequate natural shelter is available.*

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**Keywords:** animal welfare, artificial shelter, cattle, nature conservation, temperate climate, vegetation