Impact of selected factors on development of fallow deer antlers in farmed conditions

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Abstract

The subject of the study was to investigate the influence of the extension of the daylight with artificial light, application of different protein levels in the feed and various methods of mineral supplementation on the antler formation process in adult fallow deer bucks (*Dama dama*) in farm conditions. Moreover, the relationship between the age of the animals, the length of the antler development process as well as selected antler parameters were analysed. The experiments were conducted in three consecutive winter seasons. The experimental group was kept in a shed where the extension of the daylight was simulated by artificial lighting. The control group was kept on a paddock under natural light conditions. The usage of artificial lighting had resulted in acceleration of the start of the antler formation cycle by an average of: 14.8, 14.8 and 13.1 days in consecutive winter seasons. As a result, the average total length of antler formation cycle in the group exposed to artificial lighting in subsequent experiments was: 121.9, 128 and 129.1 days, compared to: 117.2, 122.7 and 124.3 days, respectively, in control groups. In the experimental group, the cycle was extended on average by: 4.7, 5.3 and 4.8 days. The average length of the antler growth cycle increased with the age. The extension of the daylight had more impact on extending the antler development cycle in animals over five years of age. In the 3-4-year-old bucks the differences in the cycle length compared to the control group turned out to be insignificant. Increasing the total protein level in the concentrated feed from 10% to 15% did not significantly extend the antler development cycle.

The applied lighting program increased the weight and volume of antlers in the experimental group, and the significance of the differences increased with the age of the bucks. In the experimental group, a simultaneous decrease in the density of individual sections of antlers was found compared to animals kept under normal light conditions. The lengthening of the daylight decreased the density of both antler beams, especially their upper sections. The significance of the observed differences increased with the age of the bucks.

Under the conditions of extended daylight, mineral supplementation administered in the concentrated feed resulted in a higher density of the lower antler sections in older bucks compared to the administration of a lick available *ad libitum*. This may indicate the need to administer higher doses

of mineral substances in the case of accelerated development of antlers. No such phenomenon was found under the control conditions.

An attempt was also made to evaluate the impact of keeping animals in a shed on their welfare. Such a situation could increase the level of stress and, consequently, aggression in individuals. For this purpose, during the last season, the level of cortisol in the blood serum was tested three times. The shed was also equipped with 24/7 monitoring. On the basis of the comparison of the serum cortisol level and the analysis of monitoring records, it can be concluded that keeping fallow deer bucks in a shed (meeting the relevant requirements) with temporary access to the paddock did not reduce welfare, including an increase in the frequency of antagonistic behaviours in comparison to keeping animals only on the paddock.