Hind-calf bonding during the neonatal period: evidence of mismatching in farmed red deer (*Cervus elaphus*)

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The neonatal period is an important phase in the life of red deer (*Cervus elaphus*), during which mother and calf form the strong bond necessary for the calf's survival. In the wild this usually occurs in complete isolation, with the hind and calf returning to the herd after a period of 1-2 weeks. In contrast, on some deer farms, paddock size, stock density and human activity can prevent isolation at the time of parturition. This may compromise the integrity of neonatal bonding between mother and offspring. The objective of this study was to consider the possible consequences of these behavioral changes imposed around parturition on some farms.

The behaviour of 29 first-calving hinds and their calves was monitored frequently over several weeks following parturition. The first of two groups (Disturbed group) was routinely disturbed by undertaking daily paddock inspections, ear tagging of calves and the undertaking of frequent observations from immediately outside the paddock. The second group (Undisturbed group), in an adjacent paddock, were exposed only to weekly paddock inspections. To determine what affect these two, often routine management practices had on hind behaviour, both groups were exposed to an observer, who remained stationary in the paddock for 15 minutes. Prior to this intervention, most hind activity involved either resting (Undisturbed 46%, Disturbed 11%) or feeding (Undisturbed 40%, Disturbed 80%) with few animals either being inactive, walking or alert (all <5%). During the intervention period, the Undisturbed hinds merely increased feeding (62%), whilst the Disturbed group became more inactive (18%), walked more (12%) or, in particular, became more alert (38%). After the intervention period, hinds in the Disturbed group quickly returned to resting (69%), whilst the Undisturbed group remained feeding (75%).

Examination of hind-calf interactions within the Disturbed group, revealed a tendency for hinds to suckle and groom calves other than their own. Of the 15 hinds and calves present, five hinds and eight calves regularly interacted in this manner, with animals alien to, and in addition to, their presumptive natural hind-calf relationship or bond. Testing of farmed deer pedigrees in New Zealand, using protein and microsatellite polymorphism, showed hind-calf mismatching to be widespread. Similar tests on a natural population in the United Kingdom did not detect mismatching. These results provide evidence to suggest that the integrity of the hind-calf bond is being compromised in some farmed deer, particularly in those animals calving together in space and time, and possibly also in those in which calving is disturbed by human activity.