

## **Horse welfare: A joint assessment of four categories of behavioural indicators using the AWIN protocol, scan sampling and surveys**

A Ruet<sup>\*†</sup>, C Arnould<sup>†</sup>, J Lemarchand<sup>†</sup>, C Parias<sup>†</sup>, N Mach<sup>‡</sup>, M-P Moisan<sup>§</sup>, A Foury<sup>§</sup>, C Briant<sup>†</sup> and L Lansade<sup>†</sup>

<sup>†</sup> INRAe, UMR 85 PRC, CNRS, UMR 7247, IFCE, University of Tours, 37380, Nouzilly, France

<sup>‡</sup> INRAe, UMR 1313 GABI, AgroParisTech, University of Paris-Saclay, 78352, Jouy-en-Josas, France

<sup>§</sup> University of Bordeaux, INRAe, Bordeaux INP, NutriNeuro, UMR 1286, 33076 Bordeaux, France

\* Contact for correspondence: [alice.ruet@ifce.fr](mailto:alice.ruet@ifce.fr)

### **Abstract**

Domesticated horses (*Equus caballus*) can be exposed to a compromised welfare state and detecting a deterioration in welfare is essential to modify the animals' living conditions appropriately. This study focused on four categories of behavioural indicators, as markers of poor welfare: stereotypies, aggressiveness towards humans, unresponsiveness to the environment and hypervigilance. In the scientific literature, at least three assessment methods can be used to evaluate them: the Animal Welfare Indicators (AWIN) protocol, behavioural observations using scans and surveys. The question remains as to whether all these three methods allow an effective assessment of the four categories of behavioural indicators. To address this issue, the repeatability at a three-month interval and convergent validity of each measure (correlations between methods) were investigated on 202 horses housed in loose boxes. Overall, the repeatability and convergent validity were limited, highlighting the difficulty in assessing these indicators in horses. However, stereotypies and aggressiveness measures showed higher repeatability and convergent validity than those of unresponsiveness to the environment and hypervigilance. Behavioural observations using scans enabled the four categories of behavioural indicators to be detected more effectively. Suggestions of improvements are proposed for one-off measures such as those performed with the AWIN protocol. Regardless of the assessment method, very limited correlations were observed between the four categories of behavioural indicators, suggesting that they should all be included in a set of indicators used to assess the welfare state of horses, in conjunction with physiological and health measures.

**Keywords:** aggressiveness, animal-based measure, animal welfare, equine welfare assessment, individual housing, stereotypies