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'Standing on the shoulders of giants'

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Behavioural assessment of the habituation of captured feral goats to an intensive farming system

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Introduced (feral) goats are an invasive animal species in Australia. They can be legally trapped by licensed operators for the domestic and export meat markets. Using quantitative and qualitative behavioural assessment (QBA), the habituation of captured feral goats to an intensive farming system (feedlot) was assessed. The goats were initially captured by a licensed feedlot operator on an extensive rangeland property and immediately transported to an intensive feedlot. Male goats ($n=120$) with a similar body mass and similar age were separated into two treatment groups: high interaction (HI, $n=60$) and low interaction (LI, $n=60$). Within each treatment group they were assigned to 3 separate pens containing 20 goats. In the HI group, a human entered the pens twice daily and calmly walked amongst the goats for 40 minutes. In the LI group, a human only briefly entered the pens to fill up feed bins (weekly). At the end of each week the goats were weighed and drafted into the 12 subgroups of 10 animals distinguished by differing ear-tag colours (i.e. 6 sub-groups per treatment). Each group was then moved into a small holding pen for an agonistic and flight response test. The goats were held in the holding pen for 2 minutes during which time video footage was taken and later analysed for number of agonistic contacts. Video footage collected at this time was also used for QBA analysis. The pen was then opened into a 3 m wide laneway the speed at which they exited was recorded. The videos of each group taken each week were shown in random order to 16 observers who used their own descriptive terms to score the animal using QBA. There was a high level of consensus between observers (42.2% variation explained, $P<0.001$). A generalised procrustes analysis (GPA) was used to identify the principle dimensions of consensus and variation explained between goats. Two main GPA dimensions of behavioural expression were identified. GPA dimension 1 (57.0% variation explained) differed between treatments ($P<0.05$); HI goats scored higher on GPA dimension 1 (more calm/content/at ease) compared to LI goats (more agitated/nervous/scared). GPA dimension 2 (13.1% variation explained) scores were not significantly different between treatments. There was also a significant effect of time on GPA dimension 1 ($P<0.001$) but not dimension 2, with goats becoming more 'calm/content/at ease' over the three weeks. The QBA data were in agreement with the quantitative measures of habituation (number of agonistic contacts, $r^2=0.76$, $P<0.01$; flight speed, $r^2=0.63$, $P<0.05$), thus supporting the usefulness of QBA as a tool for habituation and welfare assessment.