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Association of temperament with temperament index, exit score and parlour leaving speed in Gir Cows

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Abstract
The present study was conducted on Gir cows (n = 50) to see the effect of temperament with temperament index, exit score and parlour leaving speed. The temperament of Gir cows was assessed fortnightly at milking using 4 point scale scoring system(1 = docile, 2 = restless, 3 = nervous, 4 = aggressive).Temperament index, exit score and parlour leaving speed were recorded fortnightly. Temperament index was significantly ($p \leq 0.05$) higher in aggressive cows compared to docile, restless and nervous cows. The cows in aggressive groups had significantly ($p \leq 0.05$) higher mean exit score as compared to other groups. Moreover, aggressive cows had significantly ($p \leq 0.05$) higher mean parlour leaving speed as compare to docile and restless cows. There were positively and significant ($p \leq 0.01$) association of temperament score with temperament index ($r = 0.657$), exit score ($r = 0.480$) and parlour leaving speed ($r = 0.204$). Thus it is concluded that docile Gir cows had calmer behaviour during milking as well as while leaving the milking parlour.

Keywords: Temperament, temperament index, parlour leaving speed and exit score

Introduction
Traditionally, research on dairy cattle welfare has focused on assessing the effects of housing conditions and management practices on the welfare of animals (Haskell *et al*., 2006) [3]. Modified enriched environment of the animals is most important to improve their welfare status. Once the environment has been modified to best meet the demands of the animal, selecting animals with desirable characteristics based on their temperament, most suited to their production environment can additionally improve welfare and productivity. Animals that are highly responsive or fearful during normal management routine may experience poor welfare owing to increased stress as a result of their inability to cope. This leads to reduction in the production performance of dairy cattle (Hemsworth *et al*., 2002) [4] as well as their health status (Fell *et al*., 1999) [2].
Behavioural responsiveness to environmental challenges (e.g. restraint in milking parlour) can be considered to be a temperament or behavioral trait. Temperament traits are inter-individual propensities to behave in certain ways (Matthews *et al*., 2003) [7] and are stable across time (Uher *et al*., 2008) [13]. Hence, assessment of temperament could be helpful to identify the animals with poor welfare and modification of surrounding environment could improve their welfare. Further, the heritability of milking temperament in dairy cattle is low to moderate (Haskell *et al*., 2014) [14], which reflects that it is not only affected by surrounding environment but also genetic make-up of the animals. The temperament of cows at milking not only affect their production performance (Chauhan *et al*., 2013) [1] but also their subsequent behaviour particularly their gait and speed (Kumar, 2018) [5] after release from milking. Hence, this study was planned to see the association of temperament at milking with temperament index, exit score and parlour leaving speed of Gir cows.

Materials and Methods
The present study was conducted on 50 lactating Gir cows from April to May, 2022 at Cattle Breeding Farm, Junagadh. The experimental Gir cows were reared under loose housing system and fed as per Indian Council of Agricultural Research feeding standards to meet their nutrient requirements (ICAR, 2013). The cows were milked twice a day in the morning (4.00 - 6.00

A.M.) and evening (4.00 - 6.00 P.M.) by hand milking. The temperament of the experimental Gir cows assessed at milking twice a day (morning and evening milking) fortnightly and were assigned score using a 4 point scale score card system (score 1: docile to score 4: aggressive) as described by Mishra (1975) [8]. Temperament Index was calculated using the formula [Temperament Index = Number of legs lift + 2 (Number of kicks)] given by Reddy and Tripathi (1987) [11s]. Exits core was evaluated by observing gaits of cows after releasing from the milking using a 3 point scale scoring system (1: Walk, 2: Trot and 3: Run away) (Lanier and Grandian, 2002) [6]. To record parlour leaving speed the central passage was scaled (marked by red and yellow colours) at 3m intervals. Cows were tied at the time of milking and were released one after another after the completion of milking. The time taken by the cow was recorded using a stop watch. The parlour leaving speed was calculated as specific distance covered divided by the time taken to cover that distance and denoted as m/s (Kumar, 2018) [5].

Statistical analysis of the experimental data was performed using SPSS 16.0 (SPSS Inc., 2005, USA). Descriptive statistical analysis was carried out for means and standard errors. The effect of temperament on temperament index, exit score, and parlour leaving speed was analyzed using Analysis of Variance. The difference was considered statistically significant at 5% ($p \leq 0.05$) when comparing pair-wise mean differences using the Tukey Post Hoc Test. Spearman's rank correlation was used to see association of temperament score with temperament index, exit score, and parlour leaving speed. The method outlined by Snedecor and Cochran (1994) [12] was used for all statistical analyses.

Results and Discussion
Temperament Index
Temperament index was significantly higher in aggressive cows (4.129±0.128) followed by nervous (1.044±0.095), restless (0.646±0.081) and docile (0.089±0.014) cows (Figure 1). The present findings are in agreement with Pramanik (2000) [10], who reported significantly ($p<0.01$) higher temperament index in aggressive buffaloes (4.81±0.34) and lower temperament index in docile (1.13±0.06) buffaloes. Higher temperament index observed in aggressive cows is obvious, as the number of kicks were higher in aggressive cows. Higher weightage was given to the kicks in this study as they indicate temperament of higher order.
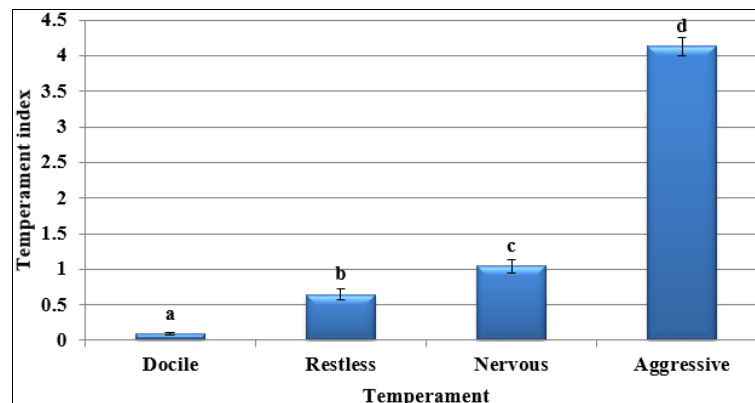

Fig 1: Temperament index of docile, restless, nervous and aggressive Gir cows

Exit Score
Cows with aggressive temperament had significantly higher mean exit score (2.152±0.087) followed by nervous (1.784±0.051), restless (1.723±0.054) and docile (1.207±0.023) cows (Figure 2). The result is in consonance with Kumar (2018), who found that exit score was significantly ($p<0.01$) higher in nervous Jersey cows (2.05±0.10) than the docile Jersey cows (1.06±0.02).With increase in temperament score majority of cows run away from the milking parlour which might have resulted higher mean exit score in non-docile cows than the docile cows. In this study, 38.82%, 14.92%. 8.46% and 2.48%, cows in aggressive, nervous, restless and docile groups, respectively run away after releasing from milking. Moreover, docile cows mostly (81.68%) walked away after release from milking as compared to other groups. Mpisana *et al.* (2021) [9] observed that majority (54.7%) of Friesland cows walked away and similar result was observed in Gir cows (58.27%).
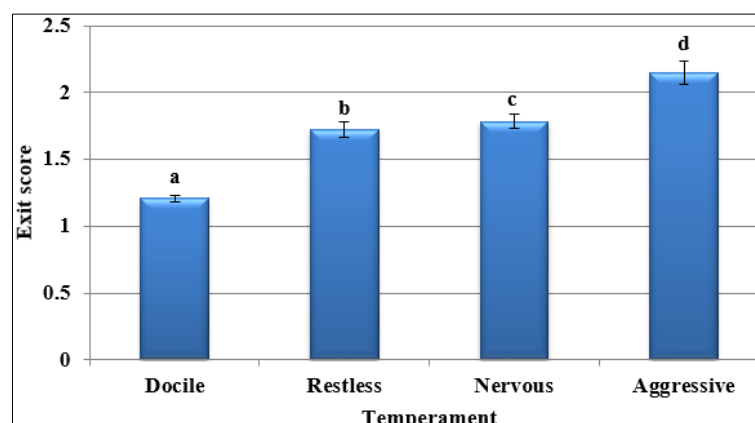

Fig 2: Exit score of docile, restless, nervous and aggressive Gir cows

Parlour Leaving Speed (m/s)

Parlour leaving speed was significantly higher in aggressive (0.45±0.054 m/s) cows followed by nervous (0.425±0.085 m/s), restless (0.227±0.012 m/s) and docile (0.205±0.029 m/s) cows (Figure 3). The result is in consonance with Kumar (2018), who observed significant effect of temperament on parlour leaving speed. He found significantly ($p<0.01$) higher parlour leaving speed (m/s) in nervous Jersey cows (0.63±0.03) and lower in docile Jersey cows (0.43±0.01).The non-docile cows mostly trot or run away from the milking parlour. This may be the reason that these cows left the parlour faster than the docile cows as the later mostly walk after milking.
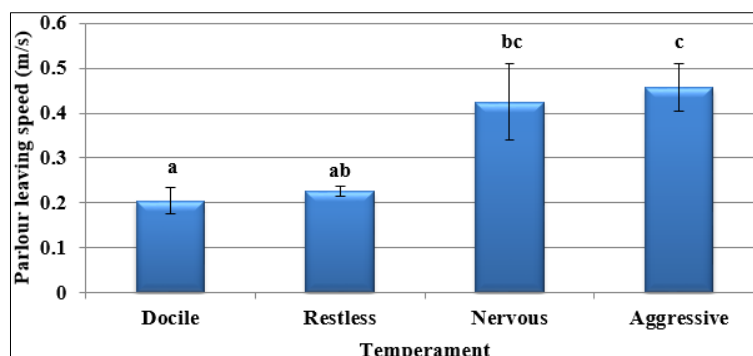

Fig 3: Parlour leaving speed (m/s) of docile, restless, nervous and aggressive Gir cows

Association of temperament with temperament index, exit score and parlour leaving speed

The results (Table 1) indicated that temperament score was moderately, positively and significantly ($p \leq 0.01$) correlated with temperament index ($r = 0.657$) and exit score ($r = 0.480$). However, temperament score revealed weak, positive and significant ($p \leq 0.01$) correlation with parlour leaving speed ($r = 0.204$). The results reflected that as the temperament score increases the temperament index, exit score and parlour leaving speed also increases. These findings are in consonance with Kumar (2018) [5], who found a positive and significant correlation of temperament with temperament index, exit score and parlour leaving speed in Jersey cows. Hence, the non-docile cows should be properly handled after their release from milking otherwise it may cause injury to the animals.

Table 1: Correlation of temperament with temperament index, exit score and parlour leaving speed

Parameter	Temperament score	Temperament index	Exit score	Parlour leaving speed (m/s)
Temperament score	1			
Temperament index	0.657**	1		
Exit score	0.480**	0.294**	1	
Parlour leaving speed (m/s)	0.204**	0.048	0.540**	1

** Significant at 1%

Conclusions

The results of this study reflected that docile animals had lower temperament index than their non-docile counterparts. Exit score was higher in aggressive groups than the other groups. Docile animals had lower parlour leaving speed than the nervous and aggressive animals. There were positive association of temperament score with temperament index, exit score and parlour leaving speed. Exit score and parlour leaving speed is an easily measured and act as an indicator of temperament, hence it could be included as a selection criterion in breeding programs.

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