Assessment of on-farm welfare in dairy cattle reared in southern Spain and its effects on reproductive parameters

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Reproductive data

The following indices relating to reproductive performance were obtained for each farm:

Calving interval (CI): defined as the average number of days that elapse between births for each cow.

Calving-first insemination interval (C-I): mean period from parturition to first insemination.

Calving-fertilising insemination interval (C-FI): mean interval between parturition and the confirmed conception of herd cows.

Inseminations per conception (I/C): number of inseminations performed in relation to the number of pregnant cows.

Fertility (FERT): percentage of animals becoming pregnant in relation to the total number of cows inseminated.

Heat detection (HD): number of cows bred divided by the number of cows eligible to get bred over a 21 day period.

The average period between parturition and the day on which the reproductive evaluation of the lactating cows was carried out, known as days in milk (DIM), was also recorded.

Data collection sequence

The day before the farm evaluation, each farmer was given a brief questionnaire. The survey gathered information on topics such as the number of milking cows, the presence of tethering (PT), access to an outdoor loafing area (OLA) or pasture (AP), dehorning method (DEH), percentage of tail-docked cows (TDC), use of anaesthetics and/or analgesics for dehorning and somatic cell count (SCC).

During the morning of the day that welfare assessment was conducted, the cows were held at the feeding rail after milking (never for more than two hours). This was when the evaluation of BCS, DLL, DHQ, DU, ND, OD, D, VD, and INT was carried out. Afterwards, a lameness assessment was conducted and scored. Drinkers were evaluated while the cows were in the shed. Finally, evaluations were made of how long the animals took to lie down in their rest area, if collisions with housing equipment occurred and the number of cows lying completely or partly outside the rest area. During this time, HR and C were also quantified.

Table S1

Data collection and scores for welfare assessment of cows on farm, according to WQ protocol (2009).

Welfare principle	Measure	Scores	Description
FEEDING	BCS	0	regular BCS
		1	very lean
		2	very fat
	WP	cm per cow	length of troughs in cm
	CWP	0	clean
		1	partly dirty
		2	dirty
	FWP	0	drinkers working correctly
		2	drinkers are malfunctioning
HOUSING	TNLD	seconds to lie down	time to lie down (seconds)
	%C	0	no collision
		2	collision
	FALPC	%	number of animals partly/completely outside lying area
	DLL	0	no dirt or minor splashing
		2	separate or continuous plaques of dirt
	DHQ	0	no dirt or minor splashing
		2	separate or continuous plaques of dirt
	DU	0	no dirt or minor splashing
		2	separate or continuous plaques of dirt
	PT	0	loose housing system
		2	tie stall system
	OLA	0	yes
		2	no
	AP	0	yes
		2	no
HEALTH	LAM	0	not lame
		2	severely lame
	INT	0	No
		1	Mild
		2	Severe
	C	number of cows	animals with a sudden and noisy expulsion of air from lungs
	ND	0	no evidence of nasal discharge
		2	evidence of nasal discharge
	OD	0	no evidence of ocular discharge
		2	evidence of ocular discharge
	HR	0	no evidence of hampered respiration
		2	evidence of nasal discharge
	D	0	no evidence of nasal discharge
		2	evidence of nasal discharge
	VD	0	no evidence of nasal discharge
		2	evidence of nasal discharge
	SCC	0	somatic cell count below 400,000 within 3 months
		2	somatic cell count of 400,000 or above within 3 months
	HC	%	% horned cows
	DEH	0	no dehorning or disbudding
		1	disbudding of calves using thermocautery
		2	disbudding of calves using caustic paste
		3	dehorning of cattle
	Procedure DEH	0	use of anaesthetics
		2	no use of anaesthetics
		0	use of analgesics
		2	no use of analgesics
	TDC	%	% tail docked cows
	TD	0	no tail docking
		1	tail docking using rubber rings
		2	tail docking using surgery
	Procedure TD	0	use of anaesthetics
		2	no use of anaesthetics
		0	use of analgesics
		2	no use of analgesics

Figure S1

Classification of dairy farms evaluated using the Welfare Quality protocol in terms of their housing, feeding and health status.