Motivations and attitudes of Brazilian dairy farmers regarding the use of automated behaviour recording and analysis systems

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Supplementary File

Materials and Methods

After the accomplishment of the interviews, data was transcribed (Fischer et al., 2019; Cachia and Millward, 2011) and the answers were coded. Briefly when the answer was one-choice, numbers were assigned and when answers allowed multiple-choice, letters were assigned, following the grammatical coding methodology described by Saldana (2013), where magnitudes are assigned to the response classes (Supplementary Table S1 and S2).

Supplementary table S1: Questions asked to interviewed dairy farmersthat already use the automated behaviour recording system (YABRS), and codes of the answers.

Questions	Response options
1. Characterization of the farmer	
1.1 Age	declared value
1.2 Education	1. Complete High School 2. Technical Education 3. Undergraduate 4. Graduate
1.3 Training area	declared value
2. Characterization of the farm	
2.1. City	declared value
2.2 State (County)	declared value
2.3 Time spent in the dairy business	declared value
2.4 Production system	1. Pasture system 2. Semi-confined 3. Confined – Free stall 4. Confined – Tie stall 5. Confined – Compost barn
2.5 Predominant breeds on the farm	1. Holstein cow 2. Jersey 3. Gyr 4. Holstein cow x Gyr crossbreed 5. Others
2.6 Number of lactating cows	declared value
3. Reasons to purchase the system	
3.1 How did you know about the remote monitoring system?	1. Other farmers 2. Events and markets 3. Enterprise representatives 4. Agreement between companies[1] 5. Internet search
3.2 Reasons that led to the acquisition of the system	1. Monitor cow oestrus 2. Monitor cow health 3. Others
4. Use of the animal's remote monitoring system	
4.1 For how long the remote monitoring system has been used?	1. Up to one year 2. From one to two years 3. From two to three years 4. More than three years
4.2 Monitored cows (% of herd)	1. Up to 25% 2. From 26 to 50% 3. From 51 to 75% 4. From 76 to 100%
5. Attitudes towards a health alert	
5.1 What do you do when you receive a health alert?	1. Nothing 2. Leave the cow under observation
5.2 What you look for in the cow?	a. Observe if the cow is approaching the trough and eating b. Observes whether the cow keeps close to herd mates or stay away from others c. Changes in milk production

	d. Mucous staining e. Perform milk forestripping f. Perform CMT test g. Rumen fill score h. Faecal score i. Locomotion score j. Body temperature k. Panting frequency l. Heart rate m. Blood clotting test n. Ketone bodies o. Urinary pH
5.3 Can intervene in the evolution of the health situation of cows	1. No 2. Yes
6. Attitudes after receiving an oestrus alert	
7.1 Actions taken an oestrus alert is received?	1. Evaluate the cow 2. Inseminate the cow
7.2 What do you evaluated in the cow?	a. Mounting behaviour b. Existence of hyaline mucus c. Gynaecological palpation exam
7.3 Do you inseminate at the time recommended by the system	1. No 2. Yes

Answers with numbers in the options: Questions with unique answers

Letter answers in options: Multiple answer questions

[1]It refers to the collaboration between the collar's provider and other companies such as feed suppliers and even dairy cooperatives, providing producers with the acquisition of equipment at a reduced cost.

Supplementary table S2: Questions asked to farmers that still do not use automated behaviour recording system (NABRS) in an online questionnaire about a remote monitoring system of the dairy cow' behaviour, and codes of the answers.

Questions	**Response options**
4. Characterization of the farmer	
1.1 Age	declared value
1.2 Education	5. Complete High School 6. Technical Education 7. Undergraduate 8. Graduate
1.3 Training area	declared value
5. Characterization of the farm	
2.1. City	declared value
2.2 State (County)	declared value
2.3 Time spent in the dairy business	declared value
2.4 Production system	6. Pasture system 7. Semi-confined 8. Confined – Free stall 9. Confined – Tie stall 10. Confined – Compost barn
2.5 Predominant breeds on the farm	6. Holstein cow 7. Jersey 8. Gyr 9. Holstein cow x Gyr crossbreed 10. Others
2.6 Number of lactating cows	declared value
3. Interest in systems to monitor cows	
3.1 Would you use an ABRS	1. No 2. Yes
3.2 Alerts that would be interesting	a. Health b. Oestrous c. Calving d. Thermal comfort
3.2 Reasons for using a monitoring system	1. Facilitate management with animals 2. Reduce the occurrence of diseases 3. Improve animal comfort and well-being 4. Improve reproductive rates of farm 5. Track production efficiency
4. Impediment to the acquisition of a monitoring system	
What prevents you from using an ABRS?	1. Not knowing where to find the service 2. Difficulty in accessing the system 3. Cost

Results and discussion

Supplementary table S3: Characteristics of dairy farms where the remote monitoring system of the animals' behaviour are used, and profiles of dairy farmers interviewed about this technology (values in each column and variable are the relative frequency of observations).

Class	NABRS (n = 22)	YABRS (n = 16)	P>ChiSq	
Age (years)			0.002	
Less than 30 years	59.09	31.25		
Between 30 and 39 years	22.73	43.75		
Between 40 and 49 years	9.09	18.75		
Between 50 and 59 years	9.09	6.25		
Education			0.001	
High school	22.73	18.75		
Technical	0	25.00		
Undergraduate	54.55	50.00		
Graduate	22.73	6.25		
Dairy activity time (years)			<0.001	
Less than 5 years	13.64	0		
From 6 to 10 years	18.18	6.25		
From 11 to 15 years	22.73	18.75		
From 16 to 20 years	9.09	6.25		
More than 20 years	36.36	68.75		
Production system			0.003	
Pasture	77.27	0		
Semi-confined	13.64	0		
Freestall	0	31.25		
Compost barn	9.09	68.75		
Breeds			<0.001	
Holstein	54.55	93.75		
Jersey	18.18	0		
crossbred cattle *	13.64	6.25		
Others	13.64	0		
Number of cows in the herd (Means ± SD)			S.E.M	P-value
	50.68 (±41.62)	165.56 (±139.74)	110.47	0,008*

*Crossbred cattle (*Bos Taurus* x *Bos indicus*).

Details of aspects observed in the animal for health assessment

a) Forestripping is used to identify clinical mastitis and California Mastitis Test is used to identify subclinical mastitis;
b) Rumen fill score and Faecal score: Scores used to assess food consumption and quality (1 = the cow eats little or nothing and 3 = well fed) , and feces consistency (1 = consistent and 3= watery, indicating severe diarrhea), respectively;
c) Locomotion score: Score to identify animals with hoof problems (1 = healthy to 5 = severely lame);
d) Body temperature: physiological indicator of infections, the animal is considered to have a fever when the rectal temperature is above 39.4ºC;
e) Panting score: score used to identify animals in thermal stress, or with respiratory complications (0 = normal to 3 = panting, open mouth, tongue protruded and huge salivation) ;
f) Blood clotting test: practical test to identify animals with tick fever or *bovine babesiosis* and *anaplasmosis*, where the blood of the animal with the disease does not clot. Farmers use a syringe to collect an animal blood sample, leaving it at room temperature and observe whether blood clotting occurs, but there is no description of the technique in the literature;
g) Ketone bodies and urinary pH: tests performed using commercial kits, which use tapes with reagents to measure the concentration of ketone bodies in the blood or urinary pH to access efficiency of anionic salts in the prepartum period;
h) Heart rate: performed by the veterinarian.