FEASIBILITY AND REPEATABILITY OF THE EBENE® WELFARE ASSESSMENT MEASURES FOR RABBITS

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ABSTRACT

The welfare of farm animals is a daily concern for farmers and its standardized assessment constitutes an important lever for progress. The EBENE method was developed to self-assess the welfare of poultry and rabbits. After many discussions and several on-farm trials, 15 indicators were selected for rabbit does (6 sanitary and 9 behavioural indicators) and 13 indicators were selected for fattening rabbits (5 sanitary and 8 behavioural indicators). This paper aimed to test the feasibility and the repeatability of the EBENE® welfare assessment measures for rabbit does and fattening rabbits. Eight assessments were carried out on rabbit does and fattening rabbits raised in cages. To assess the feasibility of the method, the assessment duration was calculated. To assess the repeatability of the welfare indicators, 2 assessors carried out the measures, initially together on the same population sample and then a second time the following day. The results were analysed with Spearman correlation tests. Indicators were said to be repeatable when the correlation coefficient r>0.40and p-value<0.10. The duration of the assessment was 83±8min which means the method is feasible. All the indicators except *Injury* and *Activity* were repeatable for rabbit does. All the sanitary indicators except *Dirty* were repeatable and most of the behavioural indicators were not repeatable for fattening rabbits. A new method to observe behaviours of fattening rabbits was proposed to improve these results. A smartphone application was then developed and is currently available to facilitate the use of the method by farmers, technicians and veterinarians.

Key words: Rabbit does, fattening rabbits, animal-based measures, welfare assessment tool.

INTRODUCTION

Animal welfare is a shared responsibility of all the actors involved in raising animals. The use of on-farm welfare self-assessment methods may help improving the welfare of rabbits by measuring precise indicators. Animal-based indicators are more and more used in Regulatory and official texts (e.g. World Organisation for Animal Health, 2019). In this context, French professionals worked on a welfare assessment method named EBENE (Evaluation du BiEN-Etre animal) which includes animal-based indicators mainly. The EBENE® method is based on the 4 principles (good feeding, good environment, good health and appropriate behaviours) and 12 criteria (e.g. appropriate feeding, movement capacity, prevention of injuries, natural behaviour) of the Welfare Quality® grid (Welfare Quality, 2009). Each criteria is associated to specific indicators that are scored between 0 (worst) and 5 (best). This paper aimed to validate the feasibility and the repeatability of the EBENE® indicators for reproducing does and growing rabbits.

MATERIALS AND METHODS

Assessment method

The assessment begins with a questionnaire to collect resource-based measures such as stocking density or mortality rate. Then, two rounds are performed in each house (rabbit does and fattening rabbits) to collect the following animal-based measures:

Breeding does:

First round - Observation of sanitary indicators 3 and 6 to 10 (Table 1) on 30 rabbit does sampled in the entire house. This implies handling.

Second round – Observation of behavioural indicators 2, 2', 4, 5 and 11 to 15 (Table 1) on 50 rabbit does. This does not imply handling.

Fattening rabbits:

first round - Observation of sanitary indicators 1, 3, 6, 8 and 9 (Table 1) on half of the rabbits sampled in the entire house, without handling,

Second round – Observation of behavioural indicators 2, 4, 4', 5 and 11 to 15 (Table 1) on the rabbits from 30 cages / pens, without handling.

Table 1 – Principles, criteria and indicators observed during the EBENE® welfare assessment. The X

Principles	Criteria	Indicators	Does	Fattening
Good Feeding	Appropriate feeding	1.Small: twice as small as the others		X
Good environment	Rest comfort	2.Resting: sitting or lying not streched out	X	X
		2'.Lying: streched out with red ears	X	
		3.Dirty: feaces or urine on the hair	X	X
	Movement capacity	4.Jumping: 2 jumps in the same direction or from/toward a platform	X	X
		4'.Moving: 1 jump or 2 jumps in different directions		X
		5.Upright position: hind legs and raised front legs	X	X
Good health	Prevention of injuries and treatment	6.Injury: lesion/irritation on the skin, eyes, ears or abscess on the skin except on the ventral part	X	X
		7.Pododermatitis: hyperkeratosis with lesion / blood on the foot pad	X	
	Prevention of diseases and treatment	8.Respiratory issue: nasal discharge	X	X
		9.Torticollis: abnormal position of head	X	X
		10.Mastitis: mammary gland congestion, abscess	X	
Appropriate behaviours	Group behaviour	11.Interaction: sneeze or groom each others	X	X
		12.Aggression: does protect its kits, fights	X	
	Natural behaviour	13.Stereotyping: wire-mesh gnawing	X	X
		14.Activity: eat, drink, forage, preen	X	X
	Prevention of stress and fear	15.Nervous: immobile, avoid assessor, turn around, ...	X	X

X = crosses indicate whether the indicator is collected for rabbit does, fattening rabbits or both.

Feasibility and repeatability of animal-based measures

Eight visits were conducted to assess the method feasibility between January, 2017 and August, 2017. The assessment was carried out between 21 and 28 days post-partum on rabbit does reared in individual cages and between 54 and 60 days on fattening rabbits reared in conventional cages of 6 to 8 rabbits. Each part of the protocol was timed.

To test the repeatability of the animal-based indicators, 2 assessors carried out the assessment at the same time on the same rabbits without talking to each other (inter-assessor); and the same assessors performed the same assessment on 2 consecutive days on the same houses (intra-assessor).

Data analysis

Collected data were analysed thanks to R (3.1.3) with non-parametric tests. All the sanitary measures were transformed in percentages (e.g. number of injured rabbit does was transformed into a percentage of injured does). The behavioural measures were also transformed in percentages for rabbit does and in frequencies for fattening rabbits.

The feasibility was assessed by calculating the mean time needed to perform an evaluation. The repeatability of the observations was tested with the Spearman test. Indicators with a high correlation coefficient ($r \geq 0.70$) (Martin & Bateson, 2013 in Sprinthall, 2003) with a p-value < 0.1 were said to

be highly repeatable. Indicators with a moderate correlation coefficient ($0.40 \leq r < 0.70$) with a p-value < 0.1 were said to be repeatable. When the correlation coefficient was less than 0.40 and / or the p-value > 0.1, the indicators were said to be not repeatable.

RESULTS AND DISCUSSION

Feasibility - Duration
The assessment of the rabbit does welfare took approximatively 40 ± 3 min and the assessment of the fattening rabbits took approximatively 43.5 ± 5 min. The total duration was 83 ± 8 min. French professionals agreed on a maximum duration around 1 hour. As the assessment of rabbit doe welfare does not need to be performed as frequently as the assessment of fattening rabbit welfare, it will mainly take 43.5 ± 5 min to assess the rabbit welfare, which is relevant with the professional's expectations.

Repeatability
- *RABBIT DOES (Table 2 – left part)*

Sanitary indicators (6 indicators):
- Inter-assessor: 5 indicators are highly repeatable, 1 is repeatable.
- Intra-assessor: 3 indicators are highly repeatable, 2 are repeatable, and 1 is not repeatable (*Injury*).

Injury may be not repeatable because of isolation or humane killing of injured does between the 2 assessments. *Dirty* was considered as repeatable even if the correlation is 0.39 as it is very close to 0.40.

Behavioural indicators (9 indicators):
- Inter-assessor: 1 indicator is highly repeatable, 4 are repeatable, and 4 were not observed (*Interaction, Upright, Jumping, Stereotyping*).
- Intra-assessor: 1 indicator is highly repeatable, 2 are repeatable, 2 are not repeatable (*Activity, Aggression*) and 5 were not observed (*Interaction, Upright, Jumping, Stereotyping*).

This indicator *Activity* should be defined more precisely to improve its intra-assessor repeatability (to be very clear about what kind of behaviours should be recorded or not). The indicator *Aggression* was rarely observed, which can explain the lack of intra-assessor repeatability for this indicator.
The indicators *Interaction, Jump* and *Upright* were not observed at all, which is due to the housing system that does not enable the expression of these behaviours (no interaction in individual cages and not enough space for the expression of the other behaviours). These indicators will be kept in the method for future observations, especially in other housing systems (such as pens).

- *FATTENING RABBITS (Table 2 – right part)*

Sanitary indicators (5 indicators):
- Inter-assessor: 4 indicators are highly repeatable, 1 is repeatable.
- Intra-assessor: 4 indicators are highly repeatable and 1 is not repeatable (*Dirty*).

Dirty may be not repeatable because of its definition, which is not very precise.

Behavioural indicators (8 indicators):
- Inter-assessor: 2 indicators are highly repeatable, 2 are repeatable, 2 are not repeatable (*Activity, Stereotyping*) and 2 were not observed (*Upright, Jumping*).
- Intra-assessor: 2 indicators are highly repeatable, 4 are not repeatable (*Interaction, Activity, Resting and Stereotyping*) and 2 were not observed (*Upright, Jumping*).

Two indicators were not observed at all (*Jump, Upright*) because of the housing system that did not enable the expression of these behaviours. These indicators will be kept for future observations, especially in other housing systems (such as pens).

Regarding the results, a new method to observe behaviours was discussed with professionals, researchers and NGOs and was tested in a few farms to assess its feasibility. Twelve cages/pens are observed for 2 minutes to record the frequency of observation of the different behaviours. Not enough data was collected to run statistical analysis but it seems there is a better agreement between assessors as long as behaviours are well defined.

Table 2 – Repeatability results for rabbit does (above) and fattening rabbits (below). In bold and underlined the highly repeatable indicators, in italic the repeatable indicators. *Interaction, Upright, Jumping* and *Stereotyping* were not observed for rabbit does and *Upright* and *Jumping* were not observed for fattening rabbits

		Rabbit dos				**Fattening rabbits**	
		Inter-assessor	**Intra-assessor**				
					Small	**0,93**	**0,72**
	Pododermatitis	**0,82**	**0,86**		Respiratory issue	*0,66*	**1**
	Mastitis	*0,59*	*0,53*	**Sanitary**	Dirty	**0,99**	Not repeatable
Sanitary	Respiratory issue	**0,72**	*0,39*		Injury	**0,72**	**0,85**
	Dirty	**0,83**	**0,91**		Torticollis	**0,89**	**0,95**
	Injury	**0,75**	Not repeatable		Interaction	*0.44*	Not repeatable
	Torticollis	**1**	**1**		Activity	Not repeatable	Not repeatable
	Activity	*0,66*	Not repeatable	**Behaviour**	Resting	**0.7**	Not repeatable
	Resting	*0,60*	*0,65*		Moving	**0.89**	**0.83**
Behaviour	Lying	*0,54*	**0,77**		Stereotyping	Not repeatable	Not repeatable
	Nervous	*0.57*	*0.53*		Nervous	*0.42*	**0.74**
	Aggression	**1**	Not repeatable				

CONCLUSIONS

The EBENE® method is feasible and the majority of the indicators are repeatable. Some indicators will be better defined (eg *Dirty*) and alternative production systems (eg enriched cages or pens) should be assessed to enable the observation of specific behaviours such as *Jumping* and *Upright*. Another method has been proposed to observe the behaviours of fattening rabbits and still have to be tested for repeatability. A smartphone app is currently available so that farmers, technicians and veterinarians have a practical tool to assess rabbit welfare with automatic results and benchmark possibilities.

ACKNOWLEDGEMENTS

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