

Claw Health Data recording in Spanish dairy cattle

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Abstract

A new electronic recording system for claw health data called I-SAP is being implemented by the Spanish Holstein Association (CONAFE) in Spain since 2012 in cooperation with private trimmers. This program is a tool developed from the continuous demand of Spanish farmers as a consequence of the detriment in claw health during the last decades. CONAFE provides each trimmer a tactile PC-tablet with a useful and friendly software called DATPAT for record keeping in farms. The trimmer connects via the Internet with the database to download herd animal data and to send information back after each working day. At the end of 2012, the program was used by four-fold trimmers than at the beginning. The increasing trend continued along the following year, with 25 claw trimmers in December 2013. These figures show the success of I-SAP implementation. Claw trimming data from July 2012 to Jun 2013, including 78,257 records registered by 21 trimmers in 834 dairy herds, were used to calculate the observed incidence rate for 6 claw disorders: Dermatitis (DE), Sole Ulcer (SU), White Line separation (WL), Interdigital Hyperplasia (HP), Interdigital Phlegmon (PH), and Chronic Laminitis (CL). Average incidence rates for DE, SU, WL, HP, PH, and CL within herd, were: 8.58%, 16.18%, 7.20%, 0.57%, 0.80%, and 3.94 %, respectively. The 85% of lesions were present in rear legs.

The mean (\pm SD) herd incidence of cows with at least one lesion was $31.72\pm 18.52\%$, 25.09% of which were new lesions and 6.63% were chronic lesions.

Recording data may take extra time and engagement, but once the claw trimmer gets used to the software, recording takes only few seconds. The advantages of electronic recording are unquestionable for trimmers and farmers, who can access to the historic database as well as the statistics whenever they need. During this two years of being used I-SAP enrolled more and more trimmers.

Keywords: Recording system, claw health traits, dairy cattle

Introduction

Lameness is the most important reason for culling in Spanish dairy farms, after fertility and mastitis. Due to the intensive selection for yield production and the increase in herd size over the last decades, claw health is getting worse. Lameness not only reduces productivity but also harms animal welfare. Nowadays, claw diseases are becoming a big source of economic losses to the dairy farmer. These losses were mainly due to a reduced milk production (Green et al., 2002) and poor fertility performance of lame cows (Barkema et al., 1994). Genetic selection for improving claw health in Spain is being addressed by feet and legs type traits but it has been shown that there is low correlation between conformation traits and claw disease traits (Van der Waaij et al. 2005). Therefore, focusing on breeding for leg type traits as Foot Angle or Rear Leg Side or Rear View will not help so much to reduce claw problems.

The Spanish Holstein Association, CONAFE, is the organism that gathers the associations and federations of Friesian cattle breeders from the Spanish Autonomous regions and it is the responsible of the National Genetic Evaluation Unit for this breed. In 2012, the number of members was 7,453 with a total of 498,169 breeding animals, representing 65% of total Holstein cows in Spain. CONAFE considers that recording claw health data is a requisite to improve claw health and to reduce the incidence of lame cows in herds. Moreover, taking advantage of genomic technology, selection for better claw health with reasonable reliability is feasible today. Therefore, in 2012 CONAFE implemented a centralized electronic recording system for 6 claw disorder traits, called I-SAP. The aim of this paper was to describe I-SAP recording system and to give some results of the evolution of its implementation.

Implementation of an electronic recording system: I-SAP

Recording claw data used to be carried out using paper and not at large scale. Only few trimmers occasionally gathered up information for scientific studies. However, recently claw-trimming professionals in Europe and North America have developed and introduced several different programs for computerised recording claw health data (Kofler, 2013). In Spain, as it was introduced in the 9th *International Conference on Lameness in Ruminants* (Charfeddine et al., 2013), until 2012 there was no recording system for claw health data. Spanish trimmers are mainly private entrepreneurs, or hoof company and service cooperative workers.

Firstly, CONAFE signed an agreement with ANKA Hoof Care Company, for developing a regular electronic recording system of claw health data. Secondly, CONAFE signed another agreement with SERAGRO, an important service cooperative which had its own recording system for claw health data, with the aim of exchanging information. In fact, SERAGRO records more lesions and scores it's in more severity scores. So, both systems are pre-set in order to be compatible, and all data are saved in the same database.

Useful and friendly software called DATPAT running with a Windows operating system was developed by CONAFE for farm data recording. Data recording relies on an easy procedure. First, the trimmer selects the farm (Figure 1). Then, for a specific cow, the trimmer score up disease traits as absence (healthy), mild or severe lesion for each claw.

CONAFE provides each trimmer involved in I-SAP a tactile PC-tablet with DATPAT software for record keeping in farms. The trimmer connects via the Internet with the database to download herd animal data and to send information back after each working day. The foot trimmer charges the farmer for the trimming service but record keeping is free of charge. The recording system was previously tested by 3 ANKA hoof trimmers. Then, it was expanded to the rest of trimmers.

Traits definition

Six common claw diseases are recorded in heifers and lactating cows: Dermatitis (DE), Sole Ulcer (SU), White Line separation (WL), Interdigital Hyperplasia (HP), Interdigital Phlegmon (PH), and Chronic Laminitis (CL).

Dermatitis: Digital and interdigital skin inflammations are recorded. The first sign of dermatitis is lengthening of the hair in the border between skin and horn and a redness of the

skin. It is a highly contagious erosive infection, affecting the skin on the bulbs of the heel, but it can also be found between the digits or in the area of the coronary band.

Sole Ulcer: It is a defect through the sole of the claw capsule often complicated by an infection of the corium, with granulation tissue, necrosis, purulent exudates and separation of the sole horn

White Line Separation: It is a fissure or a separation, which occurs in the side wall and/or sole of the hoof, allowing foreign material to penetrate and infect the white line region. Corium is affected with bleeding disorder and, eventually with necrosis and granulation tissue.

Interdigital Hyperplasia: It is a firm growth of tissue or a fibrous mass that protrudes from the interdigital spaces of the claw.

Interdigital Phlegmon: called also a Foot rot, it is a subacute or acute necrotic swelling infection that originates in the interdigital skin, leading to cellulitis in the digital or in the high zone of the claw.

Chronic Laminitis: Is a pathophysiologic disturbance in blood flow in the corium which leads to a breakdown of the dermal-epidermal junction of the hoof. It is recognized by bent, flat, square-toed, and heavily ridged appearance of the claw. It is the result of a prolonged process, and it is assumed to be caused by a series of laminitis events.

Laminitis is a primary lesion associated to other secondary lesions, as sole haemorrhages, double soles, fissures and abscesses of the white line. Thus, often in addition of diagnosis signs of laminitis event as buckled toe, others lesions were reported. Then, often it was misleading and trimmers confused whether were different lesion or not, that is why in the last monitoring workshop, the decision was made to register chronic laminitis only in case of lameness with absence of secondary lesion.



Figure 1. Field data capture.

Information generated: feedback to farmers and trimmers

Once the work is finished, the claw trimmer generates a summary report for the farmer (Figure 2). Moreover, farmers and foot trimmers can access to the I-SAP database, using their own password through CONAFE web site, to obtain historic claw statistics and graphics by animal, by visit, and by herd, as well as at regional and national level.

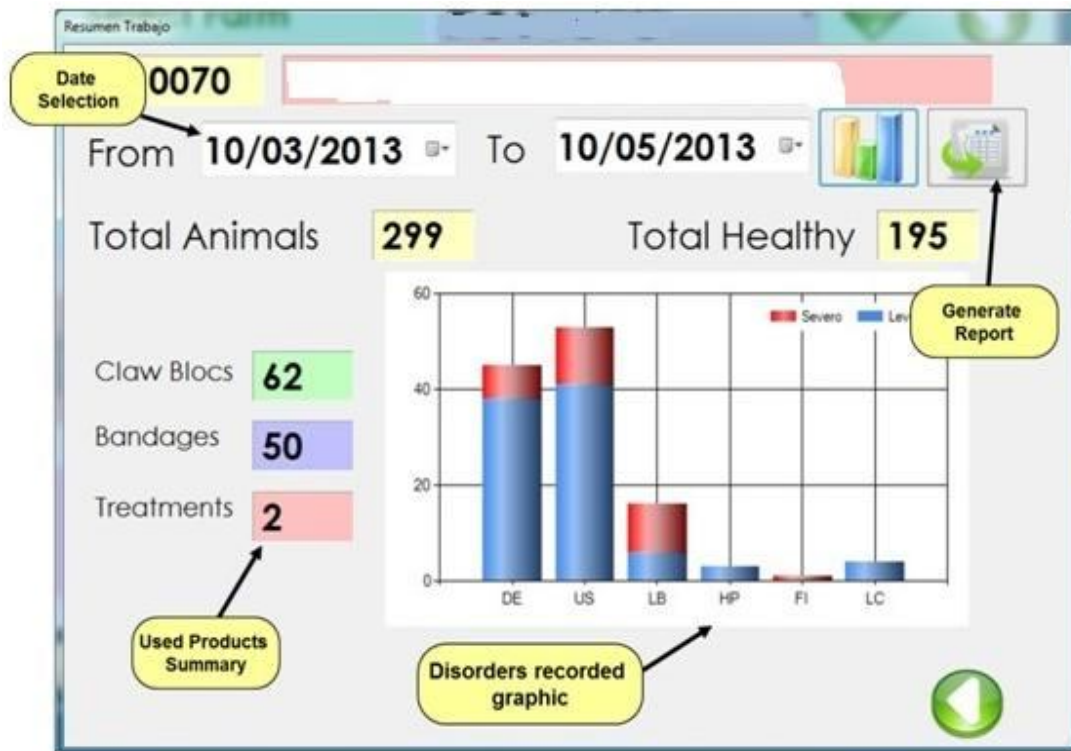


Figure 2. An example of a visit summary report.

Evolution of claw health recording in Spanish population

I-SAP is ongoing and the number of trimmers involved has grown quickly. At the end of 2012 the program was used by four-fold trimmers than at the beginning. The increasing trend continued along the following year, and the number of trimmers reached 25 in December 2013.

The number of claw health records has increased gradually since January 2012. At the end of 2013 about 1,300 farms are included in the program with nearly 200,000 trimming records registered from near 100,000 cows (Figure 3).

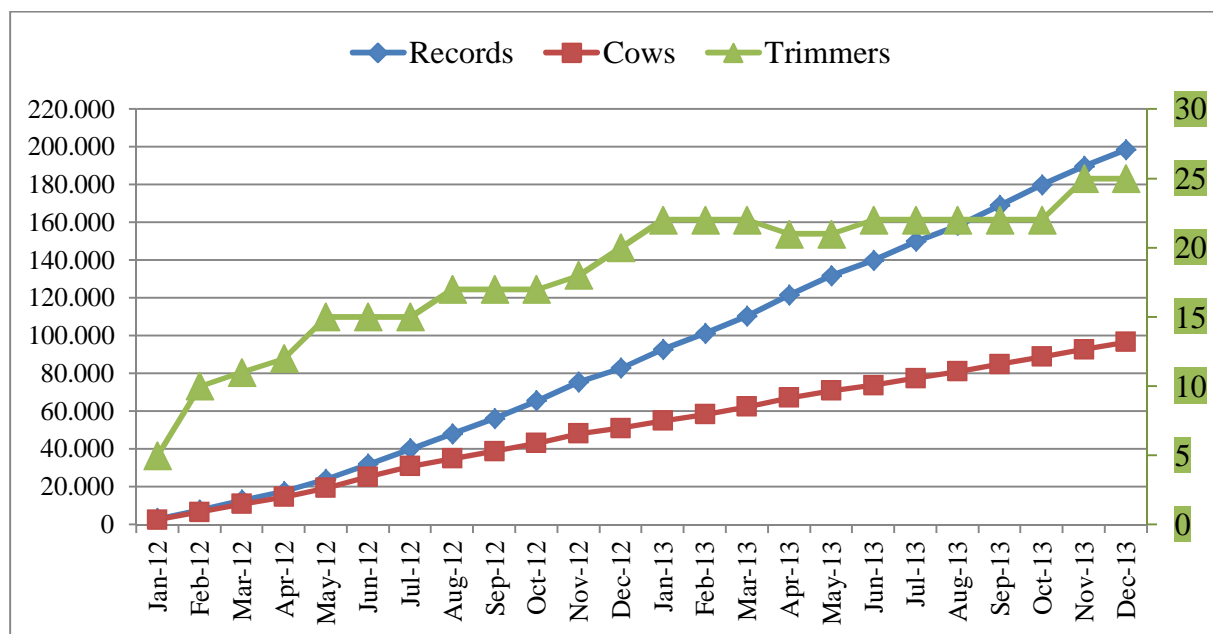


Figure 3. Evolution of claw health data

Monitoring routine

Workshops are held periodically to unify criteria and to train hoof trimmers. Since the objective is to expand to more and more trimmers, those meetings are opened to new trimmers to promote and to advertise I-SAP recording system. In September 2013, the second meeting took place at Gijon, in the North of Spain. Mean incidence rates, standard deviations and graphs showing development of each trimmer data over time, were discussed in the theoretical session. Moreover, during a practical session on farm, trimmers discussed how recording claw health data in a set of 15-20 cows. In general, trimmers had shown to have almost perfect agreement on lesion recording for all traits.

Recording data may take extra time and engagement, nevertheless once the claw trimmer gets used to the software, recording takes only few seconds. The advantages of electronic recording are unquestionable for trimmers and farmers. They are aware of the importance of having a historical dataset at both animal and herd levels that can be used for further decisions.

Prevalence of claw lesions within herds

Claw trimming data from July 2012 to Jun 2013, including 78,257 records registered by 21 trimmers in 834 dairy herds during 5979 visits, were used to calculate the observed prevalence rate within herd for the 6 claw disorders. Description of herd size and data recorded are given in Table 1. The average herd size was 104 cows, with standard deviation of 114. On average the percentage of cow trimmed within herd was 66.3%.

Data recorded during routine and urgent trimming visits were used to calculate prevalence rate. In general, routine trimmings are made twice a year, so a cow can have several trimming records by lactation. More than 36% of the cows had 2 or more claw health records. Herds reporting less than 10 records were excluded. After edition, final data set corresponded to

51,506 dairy cows; about 32% of them were in first lactation and less than 30% were in their first 150 days in milk. The high percentage of records after 150 milking days was due to the fact that Spanish farmers tend to trim their cows in the dry period.

The statistical analyses were performed in the SAS-PC System[®] Version 9.2 for Windows (SAS, 2003). PROC UNIVARIATE, PROC MEANS and PROC FREQ were used for descriptive analyses and to calculate prevalence rate at herd level.

Table 1. Description of data recorded

	Herd Size	%	%	Lactation			DIM	
		Animal Trimmed	Animal Healthy	% 1 st	% 2 nd	% 3 rd or higher	% ≥ 150d	% > 150d
Mean	104	66.3	68.3	31.9	28.2	39.8	28.5	71.4
SD	114	30.5	18.5	11.7	8.9	13.3	14.6	14.6
Minimum	5	5.4	0	0	0	0	0	30.7
25 percentile	48	47.8	56.2	25.0	22.9	31.5	17.7	61.1
Median	69	69.4	71.3	32.0	27.7	39.7	32.4	67.6
75 percentile	117	85.2	82.6	38.6	33.3	47.4	38.9	82.2
Maximum	1447	100	100	100	64.7	100	69.2	100

The mean (\pm SD) herd incidence of cows with at least one lesion was 31.72 \pm 18.52%, where 25.09% of which were new lesions and 6.63% were chronic lesions.

Prevalence rate given in Table 2 was calculated as a percentage of the number of cows that shown mild or severe lesion with respect to all cows trimmed during all the period within each herd.

Average prevalence rate mean of DE between herds was 8.58% with standard deviation of 9.87%. DE median prevalence rate within herds was 5.55% and the maximum prevalence rate was 75% of cows trimmed. SU by far is the most common lesion in Spanish dairy herds. Mean prevalence rate of SU was 16.18% with standard deviation of 12.42%. Prevalence rate ranged from 0 to 90%, where more than 50% of herds had prevalence rate higher than 12%. Average prevalence rate for WL, and CL within herd were 7.20%, and 3.94%, respectively. HP and PH were rarely recorded. Average prevalence rate for HP and PH were 0.57% and 0.80%, respectively. Most herds had a null prevalence rate for both diseases. If we consider that all non-trimmed cows were healthy, average incidence rates for DE, SU, WL, HP, PH and CL within herd, were lower: 5.26%, 10.18%, 4.13%, 0.26%, 0.45%, and 2.39 %, respectively. The 85% of lesions were present in rear legs. Average rates showed wide range as reported in the literature (König et al., 2005; Häggman and Juga, 2012).

Table 2. Observed herd prevalence mean (%), SD (%), minimum, 25th percentile, median, 75th percentile and maximum prevalence (%) within herds of 6 claw disorders in Spanish dairy cattle.

%		DE	SU	WL	HP	PH	CL
Herd prevalence	Mean	8.58	16.18	7.20	0.57	0.80	3.94
	SD	9.87	12.41	7.51	2.22	1.86	6.01
Minimum		0	0	0	0	0	0
25 percentile		0.90	7.14	1.90	0	0	0
Within Herd prevalence	Median	5.55	12.98	5.22	0	0	1.65
	75 percentile	12.90	22.39	10.00	0	0.70	5.44
Maximum		75.00	90.00	54.50	21.80	14.30	40.40

Conclusion

I-SAP is an electronic recording system for improving claw health in dairy cattle in Spain managed and funded by CONAFE. Today many farmers are demanding this service from their trimmers because they have realized the valuable management information that it provides them. Besides, the trimmers consider this recording system an useful tool for giving helpful advice to their customers. Therefore, improving the data quality could be the best way to support the recording system.

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