

## HEALTH CONTROL COSTS FOR DIFFERENT INTENSIFICATION PATTERNS IN FRENCH DAIRY FARMING SYSTEMS

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*L'étude a pour objectif de décrire les relations entre les coûts de maîtrise des troubles de santé (actions préventives ou curatives) et le degré d'intensification des exploitations laitières. La population d'étude est formée par les exploitations des Pays de la Loire, possédant plus de 25 vaches et adhérant au Contrôle Laitier. La collecte des données a concerné un échantillon de 265 exploitations en 1995/96. Les données validées ont permis d'identifier 6 classes de profils d'intensification (définis par classification hiérarchique ascendante sur les variables suivantes : race, production par vache présente, chargement, âge au premier vêlage, part du maïs dans la surface fourragère et quantité de concentré par vache). Les coûts de maîtrise de la santé relevés dans les 240 exploitations où une facturation suffisamment détaillée était disponible atteignaient en moyenne 538 FRF par vache présente et par an, ce qui correspondait à 0,07 FRF par kg de lait produit. Il s'agissait, pour 60 %, de coûts associés aux actions post-occurrence et, pour 40 %, aux actions pré-occurrence. Ces coûts concernaient, pour 11 %, les veaux, pour 11 %, les génisses, pour 70 %, les vaches et comportaient 8 % de coûts globaux. Des variations importantes existaient entre exploitations. Le niveau des coûts par vache présente était sensiblement associé au niveau de production par vache présente, mais aussi aux autres variables d'intensification. Les 6 profils d'intensification observés ne correspondaient cependant pas à des différences très marquées quant aux coûts ramenés au kg de lait produit, à l'exception de 2 d'entre eux, tous deux de type peu intensifs (où des valeurs moyennes de 0,06 versus 0,09 FRF par kg de lait ont été relevées). La part des coûts résultants d'actions pré-occurrence ne différait pas pour les 6 profils.*

### INTRODUCTION

Intensification in dairy production is today called into question. Farmers and their advisors discuss the relevance of intensification both in terms of milk yield per cow and forage crop per hectare. Little information is available on relationships between health and intensification in French dairy systems. Health features of a farm can be summarized by control costs aggregating costs of preventive and therapeutic actions. The present study aimed at providing descriptive information about: (1) implementation and costs of health control actions, and (2) relationships between these control costs and intensification patterns of dairy farms.

### MATERIAL AND METHODS

To be included in the survey, farms had to be located in the Pays de la Loire area (West of France), to be enrolled in the Milk Recording Scheme and to be willing to cooperate in a herd-health survey for 2 years. 265 farms were initially involved (87 % of the herds consisted of Holstein Friesian cattle, the other ones consisted of Normande or Montbéliarde or of cattle from 2 breeds or more).

Data collection included: (1) recording of occurrence of the main health disorders by farmers with a monthly check for consistency by a vet or a trained technician (2) description of herd and farm characteristics and of implemented control actions by 4 questionnaires administered by a member of the research team in the study period, and (3) the collection of the costs of these implemented measures from the book-keeping system of the farm. Seven farms were excluded from study for missing data regarding farm characteristics and 18 additional farms for incomplete availability or lack of details in data regarding health costs.

Groups of farms differing in intensification profile were identified using factorial analysis of correspondence and ascendant hierarchical classification. Active variables in factor analysis were: milk yield per cow-year, breed, age at first calving, amount of concentrates fed per cow-year, average annual stocking rate on the forage crop area. The identified groups were then characterized by ANOVA and chi-square tests for the initial classifying variables. Analyses were run on Statlab (SLP Statistiques, 1994) and Statview (Abacus concepts, 1996) packages.

### RESULTS

#### *Characteristics and intensification patterns of farms*

Herd size and quota per farm averaged respectively 44.1 cow-year and 320,000 l milk. Six types in intensification pattern were identified and characterized (Table I).

#### *Health costs*

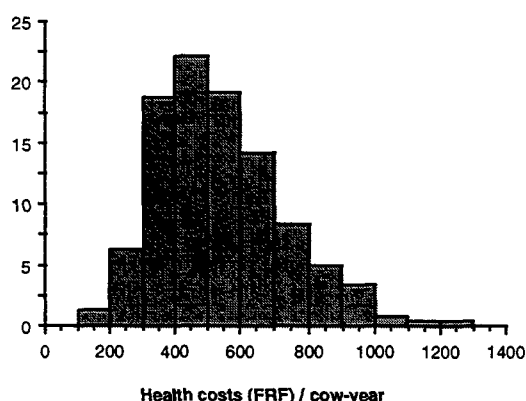
Health costs averaged 538 FRF per cow-year and 0.07 FRF per kg of produced milk (*1 FRF = .15 ECU = .17 USD*). There were large disparities between farms (Fig. 1 and 2). Average percentage of costs related to pre-occurrence control actions was 40 %. Cost of control actions for calves, heifers and cows accounted for respectively 11, 11 and 70 % of the total. The remaining 8 % were associated with expenses that could not be specifically related to any age class within the herd.

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**Table I**  
**Characterization of types in intensification (258 dairy farms)**

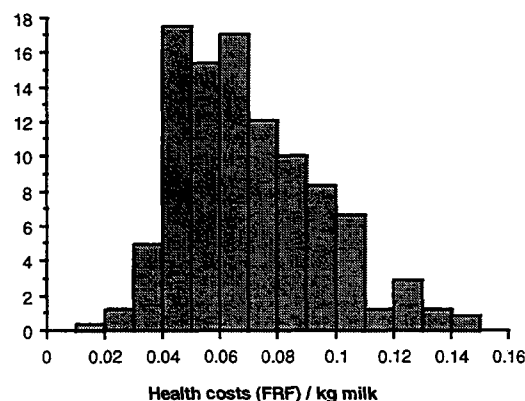
Type in intensification	Breed	Cow yield (kg/cow-year)	Age 1st calving (months)	Concentrates (kg/cow-year)	Stocking rate (livestock u./ha)	% maize in forage crop area
1. non intensive (20% farms)	Holstein	low	high	low	low	low
2. non intensive (12% farms)	other than Holstein	low	high	low	high	(all levels)
3. intermediate (28% farms)	Holstein	intermediate	low	(all levels)	(all levels)	(all levels)
4. intermediate (12% farms)	Holstein	intermediate	intermediate	intermediate	low	low
5. intensive (19% farms)	Holstein	high	low	high	intermed./high	high
6. intensive (9% farms)	Holstein	high	low	intermediate	intermediate	high
mean (s.d.) in total sample	87% Holstein 13% other	7,600 (955)	28.6 (2.8)	1,470 (390)	1.66 (0.39)	40 (15)

Frequency (%)



**Figure 1: Distribution of farms for health costs per cow-year**

Frequency (%)

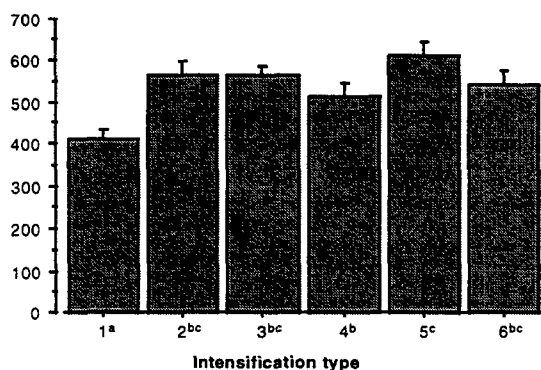


**Figure 2: Distribution of farms for health costs per kg of milk**

#### **Relationships between health costs and intensification levels**

Health costs per cow-year showed significant positive correlation with milk yield per cow-year ( $R=0.26$ ), amount of concentrates fed per cow-year ( $R=0.26$ ) and percentage of maize in the forage crop area ( $R=0.20$ ). Between-farm variation in costs was large within each type of intensification. However, significant differences were found among types both for costs per cow-year and costs per kg of produced milk (Fig. 3 and 4).

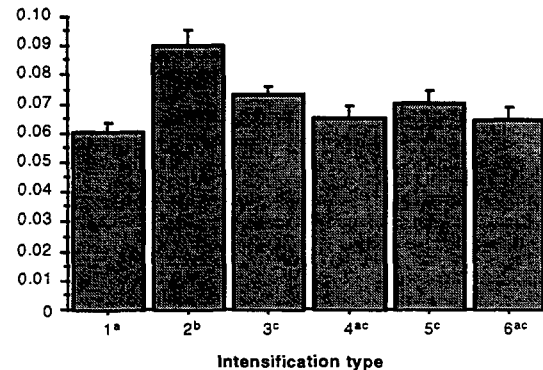
Health costs (FRF) / cow-year



**Figure 3: Health control costs per cow-year for 6 intensification types (mean and standard error)**

Notes : For definition of types: see table 1. Types with the same superscript did not differ significantly ( $p>0.05$ ).

Health costs (FRF) / kg milk

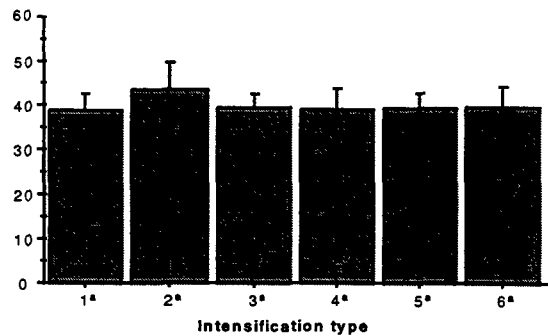


**Figure 4: Health control costs per kg milk for 6 intensification types (mean and standard error)**

Notes : For definition of types: see table 1. Types with the same superscript did not differ significantly ( $p>0.05$ ).

Relative importance of pre-occurrence control costs was not different between intensification types (Fig. 5). Post-occurrence control costs were found higher in types 2 to 6 than in type 1 (Fig. 6).

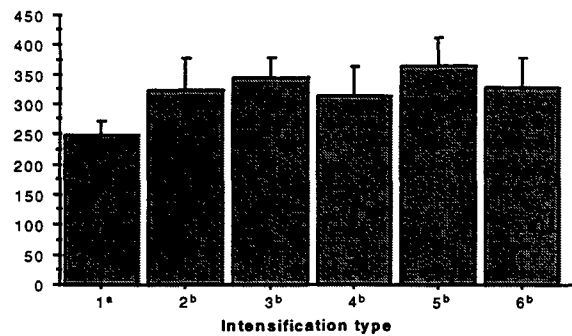
Pre-occurrence costs / total health costs (%)



**Figure 5: Pre-occurrence costs (% of total health costs) for 6 intensification types (mean and standard error)**

Notes : For definition of types: see table 1. Types with the same superscript did not differ significantly ( $p > 0.05$ ).

Post-occurrence costs (FRF) / cow-year



**Figure 6: Post-occurrence health costs per cow-year for 6 intensification types (mean and standard error)**

Notes : For definition of types: see table 1. Types with the same superscript did not differ significantly ( $p > 0.05$ ).

## DISCUSSION AND CONCLUSIONS

Health control costs constitute a continuous variable which is suitable to summarize health features for a dairy herd over a period. Moreover it is a parameter easily available which gives directly aggregated information, contrary to other data (risk assessments for several risk factors and/or occurrences of several disorders).

Large disparities in health control costs between farms were observed in our sample. Average costs per cow-year were quite higher than those recently published in France (Vallet, 1996). This can mainly be related to our study population where herds had a higher milk yield per cow-year. In this paper, no results about relationships between control costs and occurrence of health disorders were reported. However, it can be assumed that margins of improvement exist. Improvement may result from lowered control costs and from implementation of actions with better economic efficiency, as shown for mastitis on the same study sample (Seegers et al., 1997).

The unfavorable association between cow production level and occurrence of health disorders was frequently reported and discussed (for example: Erb, 1987; Distl et al., 1989; Gröhn et al., 1995). A significant unfavorable relationship was also found in our study between cow yield and health control costs per cow-year (+1,000 kg milk resulted in +10% in control costs per cow-year). However, a non significant ( $p > 0.10$ ) relationship in opposite direction was found between cow yield and costs per kg of produced milk (results not presented in this paper).

Differences in level of health control costs were limited between intensification patterns. There was no strong and systematic trend : highly intensive farming would not necessary lead to higher, or less intensive farming to lower health costs, especially when these costs are considered per kg of milk produced. However, it can be noticed that the non intensive Holstein farming system identified in our study as type 1 had the lowest average for total and post-occurrence control costs both per cow-year and per kg milk. An ongoing survey will help to determine if these lower costs are related to lower risks and lower occurrences for health disorders and/or to preferential choices made by farmers of less expensive control actions.

Finally, the notion of intensification of a dairy farming system should not be reduced only to the cow productivity in milk, which is more to consider as a resulting parameter. The production process, especially the amount of concentrates fed per cow-year and the relative importance of maize silage in rations must necessarily also be accounted for to avoid confounding effects.

## ACKNOWLEDGMENTS

The authors gratefully acknowledge farmers, technicians and veterinary surgeons for making the data available.

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