

## A controversy about crossbreeding in a conservation programme: The case study of the Flemish Red cattle breed

A. Lauvie<sup>a,b,\*</sup>, C. Danchin-Burge<sup>c</sup>, A. Audiot<sup>a</sup>, H. Brives<sup>d</sup>, F. Casabianca<sup>e</sup>, E. Verrier<sup>b</sup>

<sup>a</sup> INRA/INPT-ENSAT, UMR1248 Agrosystèmes et Développement Territorial (AGIR), B.P. 52627, 31326 Castanet-Tolosan, France

<sup>b</sup> INRA/AgroParisTech, UMR1236 Génétique et Diversité Animales, 16 rue Claude Bernard, 75231 Paris, France

<sup>c</sup> Institut de l'Élevage, Département de Génétique, 149 rue de Bercy, 75495 Paris, France

<sup>d</sup> AgroParisTech, UFR de Sociologie Rurale, 16 rue Claude Bernard, 75231 Paris, France

<sup>e</sup> INRA, UR45 Laboratoire de Recherche sur le Développement de l'Élevage (LRDE), BP 8, 20250 Corte, France

Received 11 September 2007; received in revised form 8 January 2008; accepted 9 January 2008

### Abstract

The aim of this paper was to understand the complexity of a conservation programme of a local breed by linking genetic and social data. This approach is illustrated by the case of the Flemish Red cattle breed, which has been crossbred since the 1950s, mainly with the Danish Red breed. Farmers and other people involved in the management of this breed were interviewed about breeding goals and practices. The genetic variability of the breed and the genetic impact of crossbreeding were assessed via pedigree data. The opportunity to use crossbreeding was found to be the main controversy, if not the only one, among the different institutional stakeholders involved in the management of the breed. However, the farmers said that they attributed little importance to the proportion of Danish Red genes in the AI bull genome. From the pedigree analysis, the proportion of Danish Red genes in the Flemish Red breed was found to increase from the early 1970s to the early 1980s and to then stabilise around an average value of 28%. The proportion of Flemish Red cows with no Danish Red genes in their genome decreased regularly and became null in the early 2000s. More than 90% of the Flemish Red cows born at that time had a proportion of Danish Red genes ranging from 1/8 to 1/2. The Danish Red genes were found to mainly originate from crossbred bulls and not from pure Danish Red bulls. This paper focuses on the nature of the gene pool preserved in such a case, and the need to clearly define the goals of conservation programmes is highlighted.

© 2008 Elsevier B.V. All rights reserved.

**Keywords:** Animal genetic resources; Conservation; Controversy; Crossbreeding

### 1. Introduction

The diversity of local livestock breeds represents a resource that must be effectively managed if it is to be maintained (Hall and Ruane, 1993; Barker, 1999). The

Flemish Red breed (known as *Rouge Flamande* in French) is a local French dairy cattle breed. In 2000, there was a total of 2394 Flemish Red cows in 193 herds (statistics from the French General Agricultural Census). The average number of Flemish Red cows per herd was 12.4, i.e., three times less than the national average of dairy cows per herd, due to a large number of herds with cows from both the Flemish Red and the Holstein breeds. Two-thirds of the Flemish Red cows in France are raised in the *Nord-Pas-de-Calais* region, the most

\* Corresponding author. Postal address: INRA — UMR AGIR, B.P. 52627, 31326 Castanet-Tolosan cedex, France. Tel.: +33 0 5 61 28 54 96; fax: +33 0 5 61 28 55 37.

E-mail address: [alauvie@toulouse.inra.fr](mailto:alauvie@toulouse.inra.fr) (A. Lauvie).

northern regional administrative district in France. In 2006, a total of 835 Flemish Red cows was recorded for milk production (statistics from *France Contrôle Laitier*). Since the end of the 1970s, and due to the small size of its population, the Flemish Red breed is the target of a conservation programme, with the financial support of both the French Ministry of Agriculture and the *Nord-Pas-de-Calais* Regional Council. Initially, the goal of this programme was simply to make a survey of animals and breeders and to prevent the disappearance of the breed (Masurel, 1978). However, the goal gradually shifted to the preservation of the breed's genetic diversity and an attempt to first improve traits such as protein yield, height and udder traits (UPRA Rouge Flamande, 1997), and to then improve the economic viability of livestock production with this breed, especially through the development of specific products with high value (Heyman and Stievenard, 2005). Since the 1950s, the Flemish Red breed has been crossbred with two other Red cattle breeds, namely the Danish Red breed and the Belgian Red breed (details about these three breeds are available on the EAAP database: <http://www.tiho-hannover.de/einricht/zucht/eaap/index.htm>). This decision to introduce genes from other Red breeds was taken by the Flemish Red breeders' association. It was first performed by using Danish Red or Belgian Red AI bulls and then by purchasing and selecting crossbred AI bulls.

Crossbreeding may be seen as a threat to the maintenance of genetic resources (e.g., Scherf et al., 2005) and may be prohibited by people interested in the preservation of rare livestock breeds (e.g., Bodo, 1997). On the contrary, crossbreeding may be considered as a way to bypass the limits of populations with a high rate of inbreeding; this possibility has been suggested in cases of both local breeds that have been kept closed for a long time (Gutiérrez et al., 2003) and breeds with large populations but that have suffered severe genetic bottlenecks (Hansen, 2006). The purpose of this paper is to show how the conservation programme of a cattle breed can be subject to controversy with regard to crossbreeding, i.e., gene migration, within a conservation programme. As a consequence, we addressed the following two questions: (1) how technical choices are made in a situation involving uncertainty as to which gene pool to preserve, and (2) how the animal population evolves with the practices chosen. The case of the Flemish Red cattle breed was investigated from both the social and genetic points of view, and the information provided by each approach was interpreted with respect to the other. The social aspect was considered because a conservation programme involves

a great diversity of stakeholders that have to work together and make collective choices. The genetic aspect dealt with genetic resource management and with the impact of crossbreeding on the gene pool of a rare breed.

## 2. Materials and methods

### 2.1. *The choice to cross social and genetic data to address our questions*

This work involved two commonly used methods: (1) the analysis of controversies in sociology (Callon et al., 2001), and (2) the pedigree analysis in genetics (James, 1972; Boichard et al., 1997). We chose to cross these two disciplinary approaches to better understand how stakeholders deal with the situation encountered and to assess the consequences on the genetic structure of the animal population. Attention was especially paid to the comparison between, on the one hand, the evolution of the population assessed by genetic data and, on the other hand, the goals claimed by the various stakeholders and their own representation of the evolution of the population. In other words, we tried to characterise the population constructed by the stakeholders from a genetic point of view.

### 2.2. *Understanding the controversy between actors*

The social approach was based on interviews with farmers and other people involved in the programme. A strong controversy about crossbreeding with other Red cattle populations was easily identified during the early stages of the work. The material was collected so as to understand the controversy and was organised so as to present it. As shown by some sociologists, analysing controversies is a good way to have access to the various stakeholders involved, the stakes, the mobilised arguments, etc. (Amblard et al., 1996; Callon et al., 2001). Two main points were investigated: (1) what are the conservation practices of the breeders and how do they defend their choices and practices, and (2) to what extent and under what conditions is crossbreeding a problem for the breeders?

This perspective requires highly qualitative analysis. We need to address questions to breeders using a method that makes it possible to test if and how breeders build problems about crossbreeding. Therefore, the method of semi-directive interviews seems to be the best adapted. Compared to systemic questionnaires that predefine what is problematic and what is not, and categories in consequence, in-depth semi-directive interviews allow people to express their own understanding of the situation and their own ways of defining problems (Blanchet and Gotman, 2001).

A total of 15 breeders whose herds consisted of approximately 15% of Flemish Red cows were interviewed between 2005 and 2006 (here, "breeder" refers to a farmer holding and breeding Flemish Red cows). The objective was definitely not to have a statistically representative sample of the small population of breeders but, instead, to explore the widest

Download English Version:

<https://daneshyari.com/en/article/2448564>

Download Persian Version:

<https://daneshyari.com/article/2448564>

[Daneshyari.com](https://daneshyari.com)