TRACEABILITY OF THE MOVEMENTS OF LIVING CATTLE TO DAIRY HERDS IN BRETAGNE

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Introduction

To manage animal health, it is of importance to determine the risks of introduction of a transmissible pathogen in a herd free from this pathogen. The between-herd spread of pathogens is related to the between-herd contact structure. On the one hand, this structure depends on the spatial distribution of the herds in a region and on the neighbouring relationships. On the other hand, it depends on the between-herd movements of living animals. The management of the spread of infectious pathogens then needs generally that collective control measures are applied. For dairy herds, large scale screening methods, such as the antibody testing on the milk tank, are available for the surveillance of pathogens. Therefore, control programmes for several infectious diseases have been implemented (e.g. IBR, BVD). Control actions aiming at limiting the risk resulting from animal movements should be defined according to the prevailing risks, which depend on number and types of introductions.

The objective of this study was to describe and quantify the movements of living cattle resulting in introductions of animals in dairy herds in Bretagne.

Material and Methods

With more than 800,000 dairy cows and 20% of the French milk production, Bretagne is the main breeding region in France for dairy cattle. In this region dairy and beef cattle are bred under several management systems in relation with the farmer's productive aims and with the breeds.

All animals are registered to the French identification register from 7 days of age. Available data are the identification numbers of herds, the identification number of animals, the sex, the breed and the birth date, the date and reason for entry in the herd (birth, purchase) and the date and reason for exit from the herd (mortality, sale, cull). More than 8 million cattle were registered between 1998 and 2001 in Bretagne, and 15,632 dairy herds (out of 35,326 cattle herds).

Dairy herds were defined as herds without any beef reproductive cow. Only herds with more than 10 animals were considered. Four types of dairy herds were distinguished according to their size and composition: strictly dairy herds – with more than 15 adult cows and no fattening alternative activity–, mainly dairy herds – with more than 15 adult cows and an alternative activity, such as calf or bull fattening -, small dairy herds – with less than 15 adult cows -, and herds of heifers – with only dairy females aged less than 20 months.

Movements of cattle exist between all types of herds for animals of variable age and destination (reproduction, fattening). In the case of dairy herds, introduced cattle come not only from other dairy herds, but also from herds with another main farming activity (beef herds, fattening). A movement was defined here to the exit of one cattle from his herd of origin and its entry in a dairy herd. Herds were characterised by their principal productive activity and by the possibility of an alternative fattening activity. Herd productive aims were taken into account because they are influent on the within-herd contact structure and on the decision making in terms of sales and purchases.

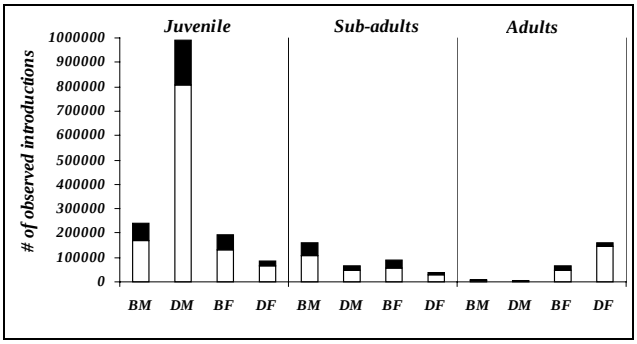
For an average year, we evaluated the proportion of dairy herds that introduced at least one animal (open), the number and type of introduced cattle, and the number and characteristics of the herds of origin when known.

Results

Among strictly dairy herds, 35% were open, whereas mainly and small dairy herds were half open. Per se, Heifers herds were almost ever open, except if they did not rear any new heifer in a given year.

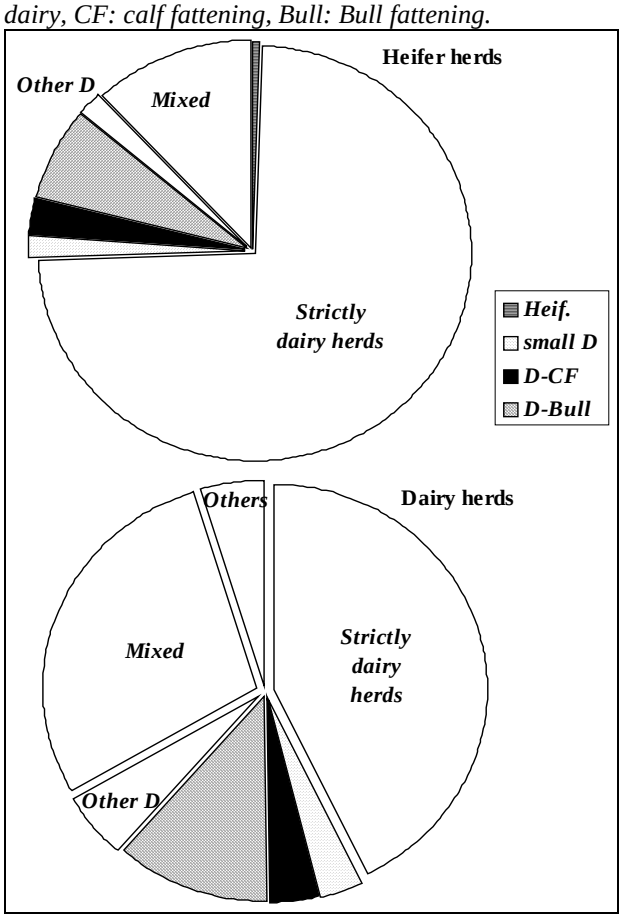
The origin of the introduced animals was known in 77% of the introductions. Availability of information depended on the type of animals (Fig. 1).

Fig. 1: Numbers of introductions in Bretagne (France, 1998-2001) with a known (white) vs. unknown (black) herd of origin, per type of animal. M: male, F: female, B: beef cattle; D: dairy cattle, Juveniles: 0-1 month old, Sub-Adults: 1-20 month old, Adults: ≥ 20 month old.



For Heifers herds, < 1/8 of the cattle did not come from dairy herds. This proportion was > 1/4 for Strictly dairy herds and > 1/3 for Mainly and Small dairy herds (Fig. 2). Cattle came from herds located in Bretagne in 88, 43, 56 and 96% of the between-herd movements for Strictly dairy, Mainly dairy, Small dairy and Heifer herds. When open, strictly dairy herds introduced in average less animals than other types of herds (6.0, 41.5, 27.7, 21.8 animals per year in strictly dairy, mainly dairy, small dairy and heifer herds, respectively). Moreover, a few number of source-herds provided animals to strictly dairy herds compared to other types of herds (3.0, 28.4, 14.2 and 8.5 herds provided animals to strictly dairy, mainly dairy, small dairy and heifer herds, respectively).

Fig. 2: Proportions of the types of herds of origin for heifer herds (top) and strictly dairy herds (back). D: dairy, CF: calf fattening, Bull: Bull fattening.



Discussion

The results given here are average numbers and proportions of movements of cattle to dairy herds. The variability in the direction and intensity of movements are also of importance for evaluating the risk of introduction of an infectious animal in a herd. We confirm here that the type of herds must be accounted for in order to define precisely the movements of animals.

Strictly and Mainly dairy herds are the two main types of dairy herds. Strictly dairy herds are often closed. When open, they buy animals from only a low number of herds. On the contrary, Mainly dairy herds introduce more animals, coming from several different herds. This potentially increases the risk of introducing an infectious animal.

Less frequent types of herds (Small dairy and Heifers herds) are not negligible in terms of between-herd infectious disease transmission because they highly contribute to the movements of animals.

Only 77% of the herds of origin were known in 1998 to 2001 despite the implementation of a national identification register. Efforts in registration are likely to have improved completeness in the data.

Conclusion

In the perspective of studying the between-herd spread of transmissible pathogens with a modelling approach, movements of living cattle have been described and quantified. The type of the herd was an important factor of variation, which influenced the type of introduced animals, their number and the origin of the introductions. The type of herds was defined on a yearly scale. The stability of the herds in a given type would be interesting to study, as well as their inclination to move from open to closed and opposite. Moreover, movements could be seasonal, which has to be further studied. Based on descriptive data, probability distributions will be defined and their parameters calibrated in order to model between-herd transmission of pathogens.