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Traceability databases in the New Zealand sheep industry

G. J. CRUICKSHANK

Genequest Limited, 511 Craggy Range Road, R D 12, Havelock North, New Zealand.

ABSTRACT

Sheep traceability will become a necessity in New Zealand to cover consumer, biosecurity and international trade requirements. The requirement to track individual sheep from lamb processors to the farm of birth is a major logistical challenge but is considerably easier than in some of New Zealand's trading partners. Definition of the requirements of a traceability system and implementation into an effective model are still under debate. A major requirement is the design and implementation of a central database to cater for present and future needs. A traceability system could be developed using databases and technology already used in the sheep industry.

Keywords: sheep; traceability; database.

INTRODUCTION

The requirement for full sheep traceability is inevitable in New Zealand (NZ) to cover consumer, biosecurity and international trade requirements. Systems for on-farm traceability of individual sheep exist and operate successfully in NZ. However, they are neither simple nor cheap and require considerable investment of time and money to operate effectively on a national basis. The investment to date has been justified by the need to provide consumer guarantees, to develop biosecurity information and to collect data for further, added value, analysis. The opportunity to adapt and extend this technology to the wider industry requires definition of database requirements for traceability and an objective analysis of the data entry, analytical and reporting requirements.

Any new or existing databases and communication systems will require development to meet national traceability requirements. This requires an analysis of the existing systems, their role and effectiveness in serving the sheep industry and analysis of their potential to accommodate any additional specifications for the desired current and future level of traceability, at minimal cost to the industry.

Traceability objectives

At present there is no national facility for tracking sheep in NZ. Several systems, operating at various levels of the industry, have been developed to cater for specialised needs. These have served the industry well but are not robust enough to meet increasingly demanding international expectations.

The main drivers for on-farm traceability at present are:

1. Consumer guarantees
2. Disease control
3. Compliance with international markets
4. Genetic improvement.

Individual processors and their overseas clients have developed systems to cover consumer driven traceability. These include customised and commercially sensitive quality assurance programmes

and varying levels of product links to the farm supplying lamb for processing. These schemes operate at a whole farm level and provide important guarantees to international customers, particularly in relation to management practices and animal welfare issues. They also provide an infrastructure to identify and isolate any source of contaminated or undesirable product if required.

Disease control requires rapid identification of the location of sheep within a specified region and the ability to track historic movements of sheep between properties.

Internationally, traceability is being driven by recent disease outbreaks, most noticeable being BSE in cattle (Europe, North America and Asia) and foot-and-mouth disease (Europe). Implementation and compulsory adoption of a traceability system for sheep is covered by European legislation. European Union Regulation 21/2004 states that sheep born after 1 January 2008 must carry an electronic identifier except those that are destined for slaughter before 12 months of age. Furthermore, the regulation will require that the movement of sheep between holdings is registered on a computerised central database. There will inevitably be a requirement for an equivalent system to be used in NZ.

Genetic improvement, including performance recording and genetic analysis, requires individual sheep identification and records of individual sheep transfer between participating breeders. It does not, at present, track animals (rams) sold to commercial farmers.

Levels of traceability

The primary requirement of a sheep traceability system is to track individual animals back to the farm of birth. The challenge for database design and practical implementation is to accurately and cost effectively account for all movement of sheep between farms.

In the case of farms with a closed flock and all surplus lambs sold direct to lamb processors, this is a simple matter and all that is required is a database containing details of sheep farm and location. There is

no requirement to physically identify sheep with ear-tags or any other form of identification.

However, if sheep are transferred to a second farm and possibly mixed with sheep from the second, or a third, farm the traceability requirements escalate. At the very least, sub groups of sheep (mobs or flocks) need to be identified within farms. To allow for any subsequent sheep movement all sheep need to be individually identified and linked to their sub groups.

These criteria define the minimum data that need to be recorded in any national database for sheep traceability. These are:

1. Owner: all owners of sheep farms in NZ
2. Farm: all sheep farms in NZ
3. Birth farm: the farm on which a sheep is born
4. Current farm: the real-time location of the sheep
5. Flock: created when sheep move between farms
6. Individual: unique id for individual sheep
Birth farm and current farm are created when sheep first move from their farm of birth. Subsequent moves trigger the creation of -
7. Intermediate farm(s).

Existing databases

AgriBaseTM, owned by AgriQuality, is a database of farm positions, and farm owners and managers, including legal boundaries (Sansons, 2005). The database includes the nature of the farming enterprise including livestock numbers and types. Approximately 90% of all sheep farmer information is captured in *AgriBaseTM*, which plays an essential role in biosecurity. The database covers points 1 and 2 above but does not record individual sheep or the movement of sheep between farms or from farm to processor.

Sheep Improvement Limited (SIL) operates a database that collects information covering the full requirements of a national sheep traceability system (Lindsay, 2000). This database is owned by Meat and Wool New Zealand and, therefore, by all sheep and beef farmers. It is designed to collect all the information that is required for the traceability system outlined above plus pedigree and performance information required for comprehensive genetic evaluations. The database, which currently only covers a specific section of the sheep industry - approximately 60% of the ram breeding population, covers points 1 to 5 above.

Allied to the SIL database is a modern communication system, that is operated over the Internet and used to upload information and to manage automated analysis and reporting remotely. Independent development of data collection and

management software (e.g. Studfax, K. Moore, *pers com.*; Macrostock, R. Girvan, *pers com.*) also allows automated data uploads. These, and other, software programs are being developed to interact directly with electronic identification devices and other data recorders, e.g. weigh scales.

The farm information held by *AgriBaseTM*, when linked to the SIL model, has the potential to provide an effective model of a central database collecting individual sheep information from throughout NZ and providing automated analysis and reporting to any authorised user on demand.

Future requirements

While the existing databases have the potential to cover the requirements of a national traceability system, they operate independently and are not integrated. In part this is because there has been no requirement to adopt standard conventions, such as a common farm identification system. To achieve a traceability-capable database the options are a) to develop an existing database, b) to develop an entirely new database or c) to integrate existing databases. Integrating databases has the advantage of allowing communication with additional databases, e.g. meat processors, in the future and would allow additional value to be extracted from the information collected.

Software must be developed for data collection and transfer to any central database, as well as for data analysis and reporting. This is probably the most demanding development as it must be robust and requires the total support of all users (farmers, transport operators, saleyards, etc.). It is also dependent on the effectiveness of any adopted system of animal identification.

CONCLUSIONS

National traceability of sheep can be achieved by modifying existing databases and communication systems. Automated data collection and transfer systems provide the biggest challenge and will require significant development funding.

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