

STRATEGIES TO IMPROVE BALI CATTLE IN EASTERN INDONESIA

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ACIAR



ACIAR PROCEEDINGS
No. 110

Implementing Pedigree Systems

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Abstract

Modern pedigree systems are based on computers that store and manipulate pedigree and performance data. It is essential that each animal has a unique identification to distinguish it from other animals in a large population. There are a number of methods of doing this and they may or may not be backed up with sophisticated electronic reading systems. For the time being in Indonesia, the use of ear tags, preferably two of them for security, will be the system of choice. Establishing accurate pedigrees in extensive systems is not easy as there may be multiple matings of females, failures to record the birth of calves or simple errors of transcription. New methods of DNA parentage are very accurate and should soon be practicable as their price and precision improve. It should not be long, for example, before there is a simple on-farm kit to enable accurate pedigrees of whole herds without needing to know the mating or calving information. With this information modern PC computers and software programs can handle sufficient information for at least the nucleus population of a large breeding scheme in Indonesia.

Introduction

MODERN genetic improvement programs currently require two important components for genetic evaluation, namely pedigree and performance data. While enormous efforts are being made to discover genes and gene actions that affect the performance of our livestock, I believe that for many years to come we cannot forgo the collection of pedigree and performance data.

Unique Identification

Today, pedigree systems have to be computer based. Gone are the days when each animal had its own card, which after years filled endless filing cabinets.

The first step for a proper computer-based pedigree system is individual animal identification with a unique number. The emphasis is on uniqueness and not on number, as any unique combination of letters and numbers can be used. Cultural differences might favour one or the other. With the very large number of animals we are dealing with in livestock populations, it is difficult to develop a unique system which

might have any meaning to identify an animal as one of a group within the population, and which doesn't get too cumbersome for the user.

A commonly used system in Australia is:

Herd code	Grade code (some breeds)	Year of birth letter	Within-herd number
ABC	P	X	0012

This is not a unique code, as different breeds might use the same herd code and the year of birth code will repeat itself about every 25 years. However, it is sufficient for day-to-day operations of breed society. In the database, this animal number is supplemented with a unique but meaningless number of more digits, with which the computer and all evaluation software will work.

For quality performance recording it is important that an animal's identification can be read easily. Different methods of on-animal identification are available. The best ones are those which are permanent, last for a lifetime and can be read at a distance. While an ear tattoo is permanent it cannot be read from a distance. Ear tags are the most commonly used animal identification device in Australia; however, they might need replacing and for breeding animals it is quite common to duplicate the system using tags in both ears, as the tags frequently get lost.

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Electronic devices incorporated into ear tags or carried in the rumen are also used and can identify an animal for life. The latter cannot be removed from a live animal, which has certain advantages. The use of electronic ear tags requires special readers that can display the signal in a readable form. However, these readers are required all the time and one has to get close to the animal for identification. Using such devices allows for a considerable amount of automation in pedigree and performance recording with minimal errors in data transcription and data transfer. However, electronic identification systems are currently too expensive to be widely adopted, particularly in breeding programs where the use of available labour is an important side effect, or where adequate electronic servicing capacity is not available.

Other options are freeze branding or hot brands; however, they damage the hide and their use is not acceptable in some countries for a range of cultural and welfare reasons.

A Pedigree System

A pedigree is a record of details of the parents of each animal. This is sufficient to establish any relationships within the population and to provide pedigree certificates covering any number of generations.

Establishing correct pedigrees in extensive beef cattle operations can be quite difficult. Commonly more than one bull is running with a group of cows and matings are not observed. On the female side, calves occasionally swap dams before the calf is tagged and its mother recorded. DNA parentage verification is one way to solve the problem, and for some management systems might be cheaper and more reliable than separating groups of cows into

single-sire mating groups in separate paddocks or enclosures. DNA parent verification is becoming cheaper with increasing automation and multiplexing of DNA tests. In the future it might well become a process performed on-farm with standard kits, only the most difficult cases being sent to central laboratories for analysis and identification.

Today the use of AI without follow-up natural service with sires makes the recording of pedigrees easier, provided technicians follow the guidelines of recording inseminations and are competent in reading and transferring numbers. In systems using fresh semen the process can be made more secure, as date and sire availability could be checked at a central distribution centre. The same can be organised with frozen semen: providing AI technicians use semen from a limited number of sires, AI records can be verified and corrected against the AI centre database.

However, even with our best efforts, we can expect that between 5% and 10% of our pedigrees are incorrect unless DNA parent verification can be carried out. I do not see this as a great problem; however, it affects the estimation of genetic parameters and the prediction of breeding values.

Use of Computers

To utilise and manage animal breeding data, computers are a necessity. The size, speed and cost of current PCs should allow every serious breeding program to have a central database containing the pedigree and performance data of at least the nucleus population. A number of software programs are available which provide low-cost solutions for beef cattle breeding programs.