STRATEGIES TO IMPROVE BALI CATTLE IN EASTERN INDONESIA

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Options for Genetic Improvement of Bali Cattle — Assessing the Strengths and Weaknesses of Alternative Strategies

Option 3. Expensive technologies and AI deleted

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Abstract

Most Bali cattle in Indonesia are bred naturally in both extensive and intensive management systems. Most of the bulls used are unselected or are those that are not sufficiently grown or finished for sale. This leads to a low chance of genetic improvement and, where new animals are not introduced from other herds, an increase in inbreeding. To overcome these problems systems have to be devised that will coordinate the breeding programs with the status of the grasslands and the feed available. In addition, education programs will need to be put in place to increase both the participation and the understanding of farmers so that, eventually, selection will be based on the calculated breeding values of individual animals rather than their mere availability or some form of subjective appraisal. This may mean certification of selected bulls and heifers and recognition that such certification denotes superior breeding potential.

Introduction

ALMOST all the data for Bali cattle breeding are from field and research station studies where natural mating was used. Although AI was introduced into Indonesia in the 1970s for beef production, the area of semen distribution is still limited. These limitations are caused by bad transport facilities, the absence of inseminators or their small numbers relative to cow density, the absence of facilities for AI, a low level of acceptance by farmers resulting from their low educational levels, and in some cases the unmanageability of cattle. Highest acceptance of AI technology is found in intensive cattle management situations because cows are easy to handle; the lowest adoption rates are in the pastoral lands.

Indonesia had around 5.4 million productive cows in 2000, of which only 0.5 million were involved in AI, the balance of 4.9 million head being naturally mated (Siregar et al. 2001a). This indicates that Indonesian beef productivity is very dependent on natural mating. The overall calving rate is around 17–18%, with rates of mortality between 5% and 6%.

The effectiveness of natural mating is higher than that of AI in terms of calving rate because mating occurs at the right time and sometimes frequently. The prerequisites for success with natural mating are that the nutritional status and body condition of both bull and female should be good to support mating, maintenance of pregnancy and post-partum milk production. To obtain best results cattle should be of a high quality, the bull-to-female ratio good, the degree of inbreeding minimal and nutrition and management good.

Natural mating is widely practised in all management systems; under pastoral conditions mating is dependent on bull and female condition, nutritional status and bull-to-female ratio. Under intensive management, mating success is not only dependent on the condition and nutritional status of the animal but also very dependent on the availability of bulls to serve cows at the right time of oestrus. Hence the role of farmers in understanding cow reproductive status for 'hand mating' is very important for the

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successful outcome of this form of natural mating. As a result calving rate in the pasture situation is usually higher than under hand mating conditions.

All the factors that could influence success should be taken into account in a breeding improvement program based on natural mating. The priority should be to use selected bulls of known fertility and to rotate bulls between herds to increase their effectiveness.

Existing Breeding Programs using Natural Mating

Existing breeding programs for Bali cattle using natural mating can be divided into two different mating management systems: natural mating in the pastoral lands (extensive management) and natural hand mating under intensive management. Both these systems have weaknesses and advantages. In the grazing lands many cattle graze in an area owned by some farmers, and farm size (cattle per farmer) is from 10 to more than 100 cows. Many cattle graze on pastoral communal land, but the status of the land used is very unstable because it is not individually owned by anybody and regional policy makers could change its status to that of non-pastoral land.

The weaknesses of the natural mating system practised in the pastoral lands are firstly the cattle. The bulls used are unselected, and usually are not the best bulls in the herd because these animals are disposed of for fattening before reaching two years (C. Talib unpublished data). Cows used for breeding are however the fertile cows, many of which are more than ten years old. Secondly, pasture conditions and pasture management are problem areas. As for other native pastures in developing tropical countries, pasture production has a wide seasonal fluctuation in quantity and quality. Consequently cattle on these pastures experience body weight loss annually because no feed supplements are introduced when nutrition is poor. Little is done for long-term sustainability of the pasture, so over-grazing occurs in some places and high weed populations predominate in others. The dynamics of cattle growth, including that of dams and calves, parallel changes in pasture production, so the pattern of available nutrition will influence breeding patterns (Wirdahayati and Bamualim 1990; Talib et al. 1999). Thus the breeding season will start at the time when cattle are in good body condition.

The weaknesses of hand mating systems are that bull quality is similar to that in pastoral lands because farmers will not permit fattening bulls to be used for breeding purposes. For that reason, cow–bull interaction is very dependent on the farmer/ keeper and the availability of bulls at the correct time. Cow owners sometimes have to pay the owner of the bull for mating activities and usually the calving rate is less than with natural mating in the grazing areas.

The advantages of natural mating are calving rates up to 80% (Kirby 1979; Wirdahayati and Bamualim 1990; Talib et al. 1999) and the fact that mating incurs no special costs. For natural hand mating, cow condition is usually better than that of cows grazing pastures and calves are usually also better grown.

Cattle grazing pastures are the source of heifer replacements for cows under intensive management systems, and of bulls for fattening. Farmers under intensive systems are more aware of commercial factors than extensive farmers, so the movement of cattle between farmers is quite high. If prices are right farmers sell their cattle at any time, and will then buy cattle in again from the pastoral lands as replacements.

The situation described above also indicates that cattle owners in the pastoral areas are very interested in participating in genetic improvement programs for Bali cattle. Consequently they keep their cows for a long time, depending on cow longevity. This could have both advantageous and disadvantageous consequences for improvement programs. The positive aspect is that good cows will have many opportunities for producing calves in parallel with their reproductive abilities. The downside is that there are increased risks of inbreeding in the herd, with older cows mating with their offspring or other relatives.

Genetic Improvement Programs using Natural Mating

Genetic improvement programs for Bali cattle in the pastoral lands and the intensive areas will need different strategies if they are to succeed. Those strategies should recognise the status and sustainability of pasture as animal feed resources, the need for participation by farmers in the program, the need for better cattle nutrition, and the nature of the genetic improvement program.

Firstly, policy makers must take into consideration the status and sustainability of the pastural land for cattle grazing and create a way for farmers to participate as users of the grasslands. If this is not done the numbers and quality of cattle on a pasture will decrease in parallel with degradation of the feed available. Recently, for the first time, smaller Bali cows have been observed on very poor grasslands in South Sulawesi, along with their small calves (Siregar et al. 2001b).

Secondly, advocacy by extension workers of genetic improvement to improve productivity is important to secure the participation of farmers. Easily available bank credits could encourage

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farmers to participate in breeding programs, increase their farm size, improve their cattle facilities and enhance family welfare. In Indonesia bank credits are given to dairy farmers under dairy cooperative schemes for these purposes, and similar arrangements should be established for beef farmers. Farmers could build up their formal organisation in many ways, such as through cooperatives, associations or other arrangements that would inspire confidence.

Thirdly, in the dry season or when other environmental stresses or conditions occur that limit feed availability, feed supplementation should be adopted. Talib et al. (1999) reported that Bali cows grazing on native pasture can lose up to 80 kg of body weight in the dry season and calf growth rates are almost zero. Wirdahayati (1994) showed that feed supplementation (legume tree leaves) can reduce body weight loss, increase milk production and lower calf mortality in the Bali herd.

Fourthly, emphasis should be given to genetic improvement programs by organising the recording, collection and analysis of data. Farmer participation rates and understanding should be increased by functional extension workers/institutes and the whole program needs an integrated approach taking account of social factors and also involving agronomic, nutrition and genetic scientists and other supporting institutions such as banks and land-use organisations. The model of P3Bali as an open nucleus breeding scheme (Pane and Packard, 1987) could be adopted; a flow chart of breeding units and their activities was proposed in an earlier presentation at this workshop (Talib et al. 2003). The disadvantages of breeding practices currently used by farmers could be reduced by using proven bulls in a rotational system between breeding units to minimise inbreeding. Selection could be focused on body weight at 120, 365 and 440 days (Talib et al. 1999). Body weight at 120 days would be representative of mothering ability of the cow and of calf survival rates; weight at 365 days would be an indication of calf growth rates; and weight at 440 days would give a preliminary picture for identification of bulls for fattening or good heifers for dams. Selection should be based on individual EBVs to ensure good results.

Using this approach, selected bulls and heifers should be certified, and it is hoped that in the future cattle prices in the market could be based on animals' phenotype and genotype.

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