BEEF CATTLE MATING SCHEMES

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CURRENT SITUATION

Although statistics are no longer collected for the breed composition of the Australian cattle herd, recent surveys have been conducted in Queensland and Victoria. In 1977 the Hereford breed was the most numerous in Queensland (2.7m head) and was increasing in importance at the expense of the Shorthorn (1.2m). Approximately 50% (5.3m) of the Queensland herd were crosses between tropical breeds and other types. In Victoria the Hereford also predominates with approximately 50% followed by Angus 20% and Shorthorn 13%. Crossbreds account for approximately 33% of the herds and it is likely that the majority of these are crosses between beef and dairy types or British beef breed crosses with a negligible influence of the tropical breeds.

It would appear that straight breeding is the most common form of breeding scheme used in Australia, but recently there has been a rapid increase in the use of crossbreeding particularly with tropical breeds in the north and European breeds in more favourable areas. The emphasis placed on research into breeding schemes has changed from straightbreeding to crossbreeding with major projects at Rockhampton (Qld), Grafton (NSW), Hamilton (Vic), Struan (SA) and Wokalup (WA). Evidence is accumulating which indicates that appropriate breeds or crosses for the north are not necessarily appropriate in the south. This provides particular problems since breed societies are responsible for the majority of promotion through shows and media and usually organised on a national basis. As a result cattle are normally presented to buyers or the public in fat condition irrespective of the rearing/feeding regime required and its relationship to the environment in which the animals will be expected to perform. There are normally no displays of crossbred animals at shows to demonstrate suitability of crossbreeding schemes.

CONSIDERATIONS OF HERD STRUCTURE RELATED TO MATING SCHEMES

In considering mating schemes we should keep in mind that our ultimate goal is to produce saleable meat economically. As an industry we should consider feed and capital inputs, on the one hand, which relate mainly to the breeding herd and returns to the enterprise on the other, which relate primarily to the number and value of slaughter progeny.

If we consider a breeding herd producing 100 sale calves a year in a good environment the following herd structure may apply.

Breeding Cows	150
Replacement heifer 15 m.o. - 27 m.o.	20
Replacement heifers 0-15 m.o.	20
Bulls	6
Sale calves (assume 80% calf crop)	100
Total maintained	296
Cows sold	15
Bulls sold = bulls bought	0

i.e. 115 cattle pay for the maintenance of 296. Under poor conditions a lower proportion of "paying" animals will be kep.

From the numbers involved it follows that the most important desirable traits to consider in selecting cattle for efficient beef production include:-

Trait

1.	Consistent high fertility, easy calving	Bulls	Cows
2.	Low maintenance cost, and capital cost		Cows
3.	Early puberty, milking ability		Cows
4.	Longevity (functionally sound, docile, long life)		Cows
5.	High Growth rate	Slaughter progeny	
6.	Valuable carcass	Slaughter progeny	

Obviously there are conflicts within this production system if traits are to be optimised, e.g. high growth rate vs. easy calving and early puberty.

USE OF LIKE TO LIKE

Most breeders strive for uniformity of type and colour of their cattle.

Formation of distinct lines within a breed does not improve productivity. It is the basic concept behind formation of most breeds and has the advantages of uniformity of type, supply, re-cognition in the particular industry, and it is easy to plan self replacing herds.

Both advantages and disadvantages of any breed or line are fully expressed. However, hybrid vigour is not utilized.

Mating similar types of breeds in a crossing program has the advantage that hybrid vigour may be expressed without changing the basic characteristics of the breeds involved. It is probably the most popular crossbreeding system in South Australia where Shorthorn cows obtained from dry parts of Australia are commonly mated to Hereford bulls in more favourable areas and the resultant progeny fattened for slaughter.

USE OF LINE BREEDING OR INBREEDING

The practice of breeding to particular bloodlines usually involves use of bulls from a particular herd on the assumption that the parent

stud is maintaining or improving performance or quality. This is a well recognised commercial practice and is evident from advertisements for store sales, clearing sales etc. where the particular bull blood-lines are often stated. This may help identify sources of cattle which will perform in a particular manner and is part of our stud culture. There is little evidence to support the reliance placed on the blood-lines when compared with performance tested sires.

IMPLICATIONS OF NUCLEUS SCHEMES TO INBREEDING

A number of nucleus schemes have been devised for beef cattle, but have generally failed. The slow rate of progress towards ill-defined goals coupled with fluctuations in market requirements have probably been the major factors involved. However, the difficulty of obtaining a series of superior unrelated sire to continue the schemes was also significant in the demise of some of these schemes. It would appear that co-operating producers pooled their animals or results and once the superior sires were identified and used, it was difficult to find replacement sires which were not related to those already in use. Where objective goals based on growth rate were set, it was found that results could be achieved faster by crossbreeding.

IMPLICATIONS OF A.I. AND/OR REFERENCE SIRE SCHEMES

Advantages-information on A.I. donors far exceeds that normally available for other bulls. Use of outstanding sires can be extended to the maximum. Producers can easily maintain a nucleus of cows to produce sires for the bulk of their cows either of the same breed or a different breed.

Disadvantages - the main disadvantages relate to the costs, effort required to run a successful A.I. program, and ignorance. With increased use of A.I.there is a real danger that the desire to use only the best progeny tested bulls will limit the choice available. The tendency of individuals and syndicates to take out semen rights to a particular bull then use that bull over the whole herd has potential to increase inbreeding dramatically.

Producers often mate top producing cows to top bulls and keep these cows in the best paddocks. This is a major problem for interpretation of reference sire schemes where unbiassed management is essential.

Where a breed society chooses a particular reference sire for a country it will aid in identification of superior sires within and between herds. However, if the emphasis placed on these few sires is too great, loss of availability of unrelated sires can become a major problem. It is already a problem for some breed societies. The open herd book register which allows inclusion of outstanding commercial animals would assist greatly in these cases. The relatively small proportion of matings by A.I. limits both its advantages and dis-advantages.

CORRECTIVE MATINGS

Corrective matings are the basic conception behind many
herd improvement schemes within a breed i.e. producers identify
outstanding individuals and use them to their maximum within a
particular herd or breed to correct deficiencies. The opportunities
are great where heritability is high such as for growth rate of
muscling.

Corrective matings have been used as the basis for the
formation of a number of breeds e.g. the inclusion of Bos indicus
blood to correct disease susceptibility followed by like to like
matings to develop distinct tick resistant breeds with better pro-
duction than any of the straightbred parent lines. In crossbreeding
schemes corrective matings offer a means of resolving many of the
conflicts between traits required in components of breeding herds,
while at the same time offering a bonus in hybrid vigour. The use
of Jersey bulls on Hereford, Simmental and Charolais heifers to
reduce dystocia and allow the heifers to grow out before being mated
to their own breed of bull; use of beef bulls on dairy cows or
heifers not required for breeding dairy replacements to improve
carcass conformation of progeny; and the use of specialised terminal
sire breeds on F1 dams are examples where this could improve overall
productivity.

PROBLEMS OF CROSSBREEDING AND WAYS TO OVERCOME SUCH PROBLEMS

Ignorance and prejudice appear to be the main deterrents
to increased use of crossbreeding. Beef cattle breeding research
is slow, it ties up large amounts of capital for extended periods
and few research workers retain interest long enough to publish
their results. The main breed promotion work is carried out by stud
breeders in conjunction with stock agents who have a vested interest
in the existing stud-multiplyer-commercial straight breeding systems.
Beef producers in general do not know the benefits which may be de-
rived from crossbreeding systems and those who do, have great
difficulty in obtaining regular supplies of crossbred animals. Pre-
judice against some breeds (particularly Brahman and Jersey) for
use in such systems is acute despite the fact that advantages re-
lating to reduced dystocia, high fertility and productivity of cross-
bred cows have been well documented.

The solution to this problem is mainly educational which
must involve administrators, researchers, extension officers,
livestock agents, producers and meat processors. The current reduced
national herd and high replacement costs of cows may emphasis the
favourable cost-benefits of soundly designed crossbreeding systems.
Some producers who imported European beef breed semen have realised
that the sales of their bulls to traditional beef breeding herds are
limited because results are less dramatic than when these bulls are
used on dairy cross females with sufficient milk to allow calves to
grow at nearer their genetic potential. Meat processors and their
agents need to be made aware of the different carcass composition of
progeny of the various crosses grown under different levels of nutrition.
Displays at carcass competitions may assist here. Major problems
with meat processors occur when carcasses of a particular breed do
not meet the trade specifications for which the animals were purchased.

Often this occurs because buyers associate shape with fatness without taking muscle content into account. This encourages a conservative approach which favours the "traditional" beef breeders. More objective guidelines to fat and muscle scoring of animals should assist this aspect.

Consistent supplies of replacements for crossbreeding are a significant problem. Supplies are more likely if buyers can contract producers to supply on a regular basis. This should reduce the risk of introducing disease as well as providing known outlets for progeny. It is particularly important where Jersey bulls are used on heifers as some producers discontinue the practice when they have difficulty selling the crossbred progeny. In larger herds, straightbred cattle could be used to sustain crossbred herds on the same property. In the U.S. some attempt has been made to overcome supply difficulties with organisations specializing in the supply of "F1 packages" by maintaining or co-operating with owners of crossbred cows and terminal sires. Producers can purchase lines of F1 heifers or cows or performance recorded sires of their choice on a regular basis.

THE FUTURE

Prejudice against the use of crossbred bulls has already broken down to a certain extend and bulls with various percentages of European and British breed composition are accepted, particularly for use on crossbred cows.

Computer technology, sales on liveweight or carcass weight and grade, media coverage of tenchiques, and the general increase in awareness of producers are already resulting in a change in methods.

Integration of crossbreeding and straight breeding schemes to increase calf turnoff and discrete use of high growth rate sires offer hope of a greater efficiency of production overall.