PRODUCTION LIMITATIONS ARISING FROM THE TYPE OF DAIRY CATTLE AVAILABLE IN TROPICAL AUSTRALIA

2. REVIEW OF FARMING PRACTICE

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INTRODUCTION

Environmental factors which may modify or supersede the effects of nutrition on dairy production are temperature and humidity, quantity and quality of water supply, wind velocity, stress situations, animal behaviour, interaction with humans and milking management.

There is an increasing volume of soundly based knowledge of the effects of the tropical environment on animal behaviour (Mahadevan, *et al.* 1968). Unfortunately, the tropical environment is very complex. Few workers have been able to reduce this complexity to individual components with sufficient clarity to enable firm recommendations on dairy farm management. Where firm recommendations are possible economic considerations often preclude promotion by extension services or implementation by dairy farmers. Adoption is also retarded by the lack of managerial ability and the normal promotion—acceptance relationships which exist in temperate agriculture, but socio-economic complications in the dairy industry seem to magnify these effects. These observations appear particularly true with regard to the type of cattle for the tropical environment.

HEAT TOLERANCE

In northern New South Wales and in Queensland there is field evidence to suggest that the so called tropical problem is one of nutrient intake rather than one of heat. Few examples, however, enable us to determine the effect of heat on dry matter intake or digestibility. They suggest that providing total digestible nutrient intake is adequate, milk production will respond in a manner not unlike the response in temperate areas. Such deductions say little about productive efficiency relative to temperate areas.

Except for the Atherton Tableland, recorded production per cow is much lower in the central and northern districts of Queensland than in the southern areas. Statistics for the last two years are as follows:—

Year	Highest Northern Production	Highest Southern Production	State Average Production
1968–69	212	261	204
1969–70	231	266	228

Breed of cattle does not vary a great deal between the two areas which appears to suggest either deficiencies in the development of an animal to maintain performance in tropical areas or a decreasing standard of nutrition in the northern dairying districts. Variations between individual herd productions would indicate

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that standard of nutrition is the important factor—one of the highest producing herds in the State is a Friesian herd located at Bowen with a production of 468 lb fat per cow in 1969/70. However, little is known of the performance of animals which are known to exhibit heat tolerance in similar feed situations. Friesian x Sahiwal cows (few production records only) appear to have a similar capacity for production to other breeds being used in tropical environments. If productive ability is demonstrated the combination of heat tolerance and tick resistance in this new breed could lead to its acceptance in coastal and northern areas of Queensland.

A four year study of average butterfat per cow in the best herd recording units in the Casino, Murwillumbah and Bega dairying districts of New South Wales is recorded in Table 1 together with the State average figures. The Casino figures are from the Bonalbo unit which is very similar in latitude to Murwillumbah. There are some small climatic differences due to location and topography and some soil differences which result in a much greater effect on natural pasture supply and quality than on the physical well-being of the cow. In this area there is a trend toward more pasture improvement, concentrate feeding and irrigated fodder production, and it may be concluded that these factors are responsible for high average production in the Casino unit. The production for herds in this unit is similar to that of the Bega unit which is located in a temperate area.

TABLE 1

Average butterfat production in selected units (lb/cow)

Year	State Average	Best Casino Unit	Best Murwillumbah Unit	Best Bega Unit
1966–67	252	278	198	258
1967–68	255	280	195	243
1968–69	244	242	196	242
1969–70	282	283	230	320

Source: Group Herd Recording in New South Wales 1965–66 to 1969–70

Similar results are obtained by examining the figures of herds recorded under the New South Wales Official Scheme. Under this scheme cows tend to be fed more uniformly and more closely according to productive ability or need. Average butterfat for Jersey cows in each of the States' dairying districts varies very little (Table 2).

TABLE 2

Average butterfat production of Jersey cows in selected dairying districts (lb/cow) Along New South Wales Coast—Official State Figures

Year	Murwillumbah	Kempsey	Nowra	Bega	State
1965–66	378	305	341	336	321
1966–67	352	304	335	363	334
1967–68	285	322	350	328	334
1968–69	260	304	351	303	316
1969–70	325	353	354	366	330

Source: Recording of Pure Bred Registered Dairy Cattle in New South Wales 1965–66 to 1969–70

From the same data, length of lactation figures from seasonal calving districts in northern and southern New South Wales show very little difference and this is also the case in Queensland (Table 3).

TABLE 3

Average lactation length in months
For Selected Dairy Districts of New South Wales

Year	Murwillumbah	Kempsey	Nowra	Deniliquin*	State
1968–69	8.4	8.3	8.6	8.3	8.4
1969–70	8.6	8.7	8.6	8.6	8.6

* Seasonal Calving Districts

Source: Group Herd Recording in New South Wales
1965–66 to 1969–70

Queensland

Year	Northern Districts		Southern Districts		State
	Mackay	Port Curtis	East Moreton	Darling Downs	
1968–69	9.0	8.5	8.6	8.6	8.6
1969–70	9.2	8.5	8.6	8.6	8.6

Source: Group Herd Recording in Queensland
Reports 1968–69 and 1969–70

Heat tolerant characteristics have been clearly demonstrated (Rendel 1970), but field observations suggest that the development of heat tolerant strains of animals may be of less importance than the adoption of practices leading to intake of more digestible nutrients.

BREEDING AND SELECTION FOR HEAT TOLERANCE

The European breeds of cattle have displayed considerable within breed differences in heat tolerance. Within herd selection of cattle on a production basis should lead to the retention of strains most adapted to the environment. Similarly, the proving of bulls within an environmentally homogeneous region should isolate the bulls whose daughters show best adaption. The relatively low level of herd recording in northern New South Wales and Queensland will make this type of breeding slow despite its possible benefits. The proving of bulls within homogeneous regions is in its infancy and as yet there is little research knowledge or field evidence to suggest the part that such practices may play in future selection programmes.

To date, the programmes developed by stud breeders who supply the seed stock to the industry has done little to aid breed improvement. There is frequent movement of breeding stock from the temperate and colder areas of southern Australia to northern New South Wales and Queensland.

Many of the most popular strains are descended in short line from cattle bred in northern Europe and Canada. Thus we have strong influence in breeding programmes from such bulls as "Tabbagong Royal Standard" (Illawarra), "Merriland Gold Spot" (New Zealand), "Carnell Super Quality" (Scotland), "Frasea Lord Jewel" (Canada), "Tolgarth Sams Illuminator" (New Zealand), "Worthy Robert" (England) and countless others.

SELECTION FOR SHAPE CHARACTERISTICS

There is no reason to think that selection of physical characteristics for tropical environments is likely to be any more productive than that for the temperate environments. The farming community has been slow to accept this fact.

SIZE AND SHAPE

A common comment about animals in the tropics is that they are smaller than their temperate contemporaries and that they tend to be sharper and leggier with less body and less fleshing. This appears in many instances to be demonstrated by field observations. The Jersey of northern New South Wales and Queensland is smaller in size and weighs some 300 lb less than her Victorian counterpart despite the fact that the two groups have a common ancestory.

Similar examples may be quoted for individual herds and animals. The Ayrshire bull "Carnell Super Quality" was used for artificial insemination in New South Wales and Queensland. In temperate New South Wales the daughters were large, coarse, heavily fleshed beasts. In Queensland they were smaller, finer and much less fleshy.

To offset this pattern however, innumerable examples may be given of individual herds throughout Queensland where similar stock, almost side by side, show quite different characteristics of size, sharpness and fleshing, and legginess due largely to different standards of rearing and nutritional management. Similar patterns occur in Victoria and in New Zealand where high stocking rate and restricted feeding are practiced during the winter dry period of the herd. Farmers who carry these practices to the extreme have heifers calving much younger and smaller herd cows which are sharper and lighter in condition than those of neighbours with much lighter grazing pressure.

It is doubtful whether heat and other tropical factors are likely to be of great importance compared with nutritional management as a cause of the observed differences in cow shape or size. Certainly there is no evidence to suggest that cattle should be selected for these characteristics.

SELECTION FOR COLOUR

Among dairymen, there is a strong feeling that white colour is undesirable because of increasing problems of photosensitization and skin cancer. Thus dairymen in northern New South Wales and Queensland consciously select animals that are whole coloured. Roan or large white patches in A.I.S. are avoided. Broken coloured Jerseys find less favour than whole coloured ones and Guernseys and Ayrshires showing as little white as possible are preferred. Undoubtedly this same pattern will eventually apply to the Friesian breed as it extends into more tropical regions.

Although this aspect is accepted, an equally soundly based fact, that dark colour absorbs heat whereas lighter colours reflect it, does not seem to have had acceptance. Some breeders of predominantly black Friesian-Jersey crossbreds have reported that these cattle seek shade much sooner than lighter coloured animals. These farmers tend to seek predominantly white Friesian sires to avoid whole coloured blacks in the crossbred. Generally however, the deep cherry red A.I.S. is preferred and there has been little objective selection of the lighter fawns in the Jersey breed.

TICK RESISTANCE

It is doubtful whether a discussion of cattle type in the tropics is possible without acceptance of some form of tick control. It is recognized that the effect of cattle tick may nullify other good management practices. This effect occurs both by direct infestation with tick and through the transmission of tick borne disease. The development of successful tick eradication procedures based on pesticides seems possible in New South Wales, but the magnitude of the problem makes this much more unlikely in Queensland. In that State, development of strains of cattle tolerant of, or resistant to, infestation offers much better prospects of control but such methods are by their nature rather protracted. This approach depends upon the introduction of a recognised level of Zebu type blood into the European cattle. Direct introduction of Zebu type blood into commercial herds has not been encouraged or pursued despite the fact that similar practices for production of beef are well accepted. The development of refined strains of Zebu cross bred has now reached the commercial stage. To date farmer interest has been in the form of curiosity rather than active demand for cattle of these strains. A bull of high potential bred in the Milking Zebu Project is available from both Wacol and Graham Park Artificial Stock Breeding Centres but farmer demand has not extended the use of either bull to full capacity. At a sale of Australian Milking Zebu type animals at Casino in 1970, most of the animals offered were purchased by beef interests. Cost may have been a factor contributing to this as prices were generally well above those that commercial dairymen in the area are likely to pay.

Shape must also be regarded as an important deterrent. The Zebu crossbreds are generally noticeably different in head, rump and udder characteristics from the European type animals now accepted for dairy purposes.

CONCLUSION

The limited amount of production recording in New South Wales and Queensland demonstrates that acceptance of the principle that selection of animals on a production rather than a type basis has not been widespread. As the use of proven bulls and herd breeding programmes aimed at developing herds of maximum production potential is by no means widely accepted, it is apparent that type considerations frequently override production ones.

In the more tropical areas of New South Wales and Queensland socio-economic factors compound this attitude with the result that approximately 10% of herds in Queensland and 13% of herds in the North Coast Region of New South Wales use the Herd Recording and Artificial Breeding Services available to them.

Research and the development of breeding programmes to provide dairy animals exhibiting the desired characteristics for a tropical environment were initiated little more than ten years ago and few sires are available to farmers. Early in the programme emphasis was placed on the Jersey and Sahiwal breeds. Already the Friesian has replaced the Jersey on many dairy farms with a consequent change of farmer interest to the Friesian x Sahiwal animal. Semen of this breed will become available at Wacol in 1972.

Under these conditions one can expect the change of cattle type to one offering heat and tick resistance to be slow and irregular unless official action forces or encourages such a change.

REFERENCES

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DISCUSSION

Factors to be considered in the selection of dairy cattle for the tropics

It was generally agreed that dairy cattle should be selected firstly on their ability to produce milk within the tropical environment. The improvement of pasture and crop production, strategic supplementary feeding, herd recording, and the use of proven bulls, all appear more important than the development of new dairy breeds to obtain increases in milk production in tropical and subtropical areas.

Selection for tick resistance within the European breeds

It is imperative that present breeding programmes be further developed to cover breeding for tick resistance because of the possible breakdown in cattle tick control by acaricides.

Whilst the inheritance of tick resistance is thought to be the same for European and tropical dairy breeds, the level of resistance against ticks appears to be lower within the European breeds and may not be high enough to warrant a selection programme.

Present breeding trends

The increase, in recent years, in numbers of Friesian cattle in tropical and subtropical areas may affect the rate of acceptance of new breeds which are being developed for tropical areas. However, this would depend entirely on the success of Friesians or other traditional dairy breeds in the areas in which they are now being used. The A.I.S. breed has shown ability to produce at high levels in tropical environments and may be of further value in cross breeding programmes.

Possible use of new breeds

There is insufficient information at this stage to advise dairy farmers to change the present breed structure of their herds. Any change could only be justified if the new breeds proved superior to traditional breeds in milk production. However, the establishment of new breeds might be encouraged in localities where cattle ticks are limiting production.