



**AUSTRALIAN NUFFIELD FARMING SCHOLARS
ASSOCIATION**

**REPORT OF VISIT TO THE
UNITED KINGDOM**

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(Queensland 1986 Award)

A study of red dairy cattle breeds in the United Kingdom and Europe

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INTRODUCTION

This report results from my visit to the United Kingdom and Europe beginning in March 1986, and finishing in August of the same year. Two months were spent in Europe.

The aim of my visit was as follows:

To evaluate the suitability of the red dairy cattle breeds of the United Kingdom and Europe for genetic infusion into the Illawarra cattle of Australia.

While on my scholarship I also took the opportunity to gather information on the following subjects:

1. The suitability of computers for the farmer.
2. The Premier (M.O.E.T.), Multiple Ovulation Embryo Transfer Scheme for Genetic Improvement.

This report concerns information on the dairy breed which I consider to be of practical importance to the Illawarra Breed.

During the course of my studies I saw the following breeds:

*Swedish Red - Sweden

- *Angler - North Germany
- *Danish Red with Brown Swiss influence - Denmark
- *Ayrshire - England and Scotland
- *Blended Milking Shorthorn - England
- Brown Tirol - Austria and Southern Germany
- Fresian and Fresian/Holstein - England and Wales
- Meuse Rhine Ijessel - England and The Netherlands
- Milking Shorthorn - England
- Normandy cattle - France
- Norwegian Red - Norway
- Red Holstein influence - England and Scotland
- Red Fresian influence - England

Whilst this was not an exhaustive search for red dairy breeds, I believe that I saw some of the best and most progressive in Europe.

This report will concentrate on those breeds most suitable for infusion into the Illawarra breed. That is, the breeds most closely resembling the Illawarra breed as it is today: cattle whose genes should increase production ability, yet maintain the basic Illawarra characteristics.

* Breeds reported upon.

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RED DAIRY BREEDS

SWEDISH RED

The Swedish Red cattle are a medium sized red breed with identical colour characteristics to the Illawarra, being the most like the Illawarra of any breed in the world. Almost 250,000 of these cows are in the milk recording scheme.

Origin

The Swedish Red Breed (S.R.B.) originates from the Red Swedish Cattle and the Swedish Ayrshire. The former had been developed since 1880 by indigenous cattle and English Dairy Shorthorn. The Swedish Ayrshire resulted from the upgrading of native dairy cattle with imported Ayrshires. As a result of good milk yields the S.R.B. is now the predominant breed in Sweden. About 60% of the dairy cattle in Sweden are S.R.B.

Since 1953, credit for the successful progress of the breed has been due to the early use of Artificial Insemination and compulsory progeny testing.

S.R.B. Today

The Swedish Red Breed today is controlled by four major farmer owned breeding co-operatives, that take the responsibility for all aspects of breeding, performance testing and proving bulls and semen production. The S.R.B. collaborates with the red breeds in Norway and Finland, using outstanding sires from those as potential bull sires in their co-operative

breeding programme. The S.R.B., like most modern European dairy breeds, is a dual purpose breed which has outstanding production capacity. (All dairy cattle are dual purpose to some extent since the cull cow and calf have some value.)

Milk Production

The S.R.B. is recognised as the highest producing red dairy breed in the world. Sired by top United States and Canadian sires, they are outproducing the Black and White dairy cattle in Sweden. Since 1960 the milk yield has increased rapidly, as shown in Table 1.

Table 1

Average milk yield and number of recorded S.R.B. cows 1960 to 1985.

Year	Milk	4%FCM*	Fat		Protein		Number of recorded cows
	litre	litre	per cent	kg	per cent	kg	
1960	4,434	4,502	4.10	176			190,468
1970	5,221	5,324	4.13	209			225,125
1975	5,554	5,613	4.07	219			224,372
1980	6,032	6,226	4.20	246	3.50	205	233,096
1985	6,523	6,838	4.32	273	3.45	218	244,696

* FCM - Fat Corrected Milk

Production of the top herd visited: 8,500 litres 4.1% bf

= 350 kg average from 80 cows. A top cow's four year average production was

10,041 litres 5.2% bf = 510 kg. Her best year's production being 18,224 litres 5.6% bf = 716 kg 3.7% protein = 474 kg. (186 Rosamumna S.R.B. 100299)

Beef Production

95% of all bull calves in Sweden are used for beef production. Selection for beef producing traits has been included in the Artificial Insemination breeding programme since 1969. All potential Artificial Insemination bulls are tested for daily live weight gain.

Disease Resistance

Through a national programme, all veterinarians report about all animals treated. This information is in a computer program combined with statistics from Artificial Insemination and milk recording. Amongst other things, this provides figures or frequencies of different diseases among daughters of individual Artificial Insemination bulls. Cows with a history of disease or other problems, e.g. milk fever, ketosis, mastitis, or calving problems, are not eligible to become bull mothers. In this way the health of the national herd is improved.

Breeding Programme

Four regional co-operative bull centres are responsible for the breeding work within the S.R.B. They work closely with the Swedish University of Agricultural Sciences, and the National Organisation for Livestock Breeding.

Aim

The aim of the S.R.B. is to breed a dairy cow that will return the dairy farmer the maximum profit. Special emphasis is put on the following:

- Fat and Protein yield
- Male and female fertility
- Udder and test traits
- Resistance to disease
- Quality of legs and feet
- Growth rate.

Procedure

- From the 250,000 purebred and milk recorded cows, around one percent are selected as bull dams and are mated to a few of the very best proven bulls i.e. bull sires. Bull sires are selected in Sweden, Norway, and Finland.
- After inspection of the dams and numerous tests, 350 bull calves are purchased each year.
- These bull calves are reared at a performance testing station from 60 to 365 days on a standardised ration consisting of a moderate amount of concentrate and free access to hay. This encourages bulls with large capacities to utilise roughage. This ration is designed for optimum semen production, not maximum beef production.

- Selection is made for growth rate, conformation, mating behaviour, semen quality, freezability, and pregnancy result in a limited field test. 150 bulls are approved annually as test bulls and mated to produce 100 to 150 daughters per bull, in milk recorded herds, with a complete first lactation as a basis for progeny testing. About 1 in 10 proven bulls is selected for widespread use after progeny testing, i.e. 15 bulls annually from a herd of 250,000. Only the elite of these will become Bull sires. It is necessary for the farmer to use at least 40% unproven bull semen in order to gain proofs for these future bulls. Each co-operative has its own method of achieving this. Some with regulations, e.g. 40% unproven, 50% proven, 10% free choice. Others use price to make unproven semen attractive.

Milk Pricing

The milk price varied in different regions. For milk that exceeds 4.1% fat, it is common to pay for the fat corrected volume, i.e. the volume of milk if it were diluted to 4.1% fat. A common price per litre for 4.1% fat corrected milk was 2.70 S.E.K. (about \$0.54 - February 1986)

Feeding and Housing

Cows are housed only during the late Autumn, Winter, and early Spring in loose housing, quite similar to the United Kingdom farming system. While conditions are favourable outdoors the cows are grazed in small paddocks and brought to the milking parlour (usually herringbone) twice a day. It is common for high producing cows in this system to be fed a portion of their daily concentrate ration (4 to 6 times per day) via a computer

controlled feeding stall where the computer recognises the individual cow as she approaches, by the transponder on her collar.

Many farms still tie their cows by the neck all Winter. The milking machines are brought to the cows and connected to the overhead milk lines. During Summer, the cows are brought to the same barn twice a day, tied or caught in a head stall to be milked in the same way. This system makes it simpler to individually feed high producing cows in an all year round calving pattern. The largest herd seen was 80 cows.

There are only a few herds in Sweden with more than 100 cows. Cow housing and feeding is similar to the United Kingdom system. The basic ration consists of rye grass silage and concentrates. A lot of oats is fed to cows as grain. Many areas cannot grow wheat due to the short growing season. Top cow breeders regard barley as a food for pigs - NOT COWS.

Summary

In many regards the S.R.B. cow is quite similar to the Illawarra - historically, in appearance and size, and dairy character. Therefore they offer us a genetically compatible alternative. Due to the thorough selection process and the volume of information available on S.R.B. sires, we should be able to predict the outcome of such matings with the Illawarra with more confidence. The rapid improvement of the S.R.B. since 1960 owes much to the competent, professional and methodical approach to sire selection and the co-operation of the breeders. This level of co-operation, I feel, would be impossible to obtain in Australia, given the

rebellious and individual nature of Australian farmers, combined with the multitude of diverse milk recording and breeding systems offered in the various states.

ANGLER

The Angler is a medium sized breed, red in colour, no white, with dark to black points, i.e. the muzzle and the skin around the eyes and anus, and the hooves are dark. A sharp, angular cow, this breed has a lot of dairy character. The breed numbers some 35,000 cows with most being in the Schleswig-Holstein area of northern West Germany. The farms are mostly smaller family operations, with a herd average of 30 cows. Stock breeding rules set up in the Hitler days to make Germany self sufficient, have been very rigid, but successful for their system where there are many small farms. Due to the E.E.C.'s insistence on uniformity, these rules may have to go.

Origin/History

In 1838 the people in the Angeln area started to pure breed the cattle of the area. It was not until 1879, however, that the registering of the breeding details was collated into a central herdbook.

1902 saw the beginning of Official Milk Recording.

In the 1920's, laws applying to the breeding of all livestock were introduced, making it necessary for all sires to be tested and approved. This was an important step towards improving the genetic material available to the average farmer, whose herd was often too small to justify owning a quality bull. Eight cows was considered a large herd.

In 1959, the first performance testing station in the world was started, to record the daily live weight gain of young bulls. Most of Europe's beef comes from the dairy herd, so it is important to select for growth rate.

Anglers Today

Collaboration with the Danish Red, Swedish Red, and Norwegian Red breeds in the selection of elite potential bull sires, is now part of the Angler co-operative breeding programme. The Angler breed is prepared to use suitable genetic material from anywhere in the world to improve the breed. At present a few progeny of Danish Red sires are in performance testing stations. Pure Swedish Red yearling heifers have also been imported for a comparison trial on a small number of herds. Since 1932 the Angler has led all German breeds in butterfat yield.

Milk Production

These cows are recognised for having the highest yield of fat and protein of any breed in the world. The factories now pay a premium for high fat and protein. One Angler farmer, received \$0.53/kg for his milk. His factory's average payment to suppliers was \$0.43/kg. This, and their ability to produce from a high forage diet, returns an Angler breeder the highest nett returns per hectare of all breeds of dairy cow in West Germany.

An independent, indepth study of dairy farmers' incomes in the Schleswig-Holstein area of West Germany has shown that Angler farmers are receiving around 121 DM (\$80.00) per cow, or 812 DM (\$541.00) per hectare more than

farmers with Black and White cows. The majority of the extra income results from:

- The higher value milk
- More efficient use of forage - lower concentrate usage
- Higher stocking rate
- Lower veterinary and medical costs.

The performance of herd book cows has increased markedly since 1932 when similar to the Black and White, and Red and White cattle of the region.

Year	Milk litres	B.F. %	B.F. kg	Percent
1900		3.3		
1932	3,922	3.55	134	
1982	5,387	4.75	248	3.59
	1,465	+1.20	+114	

Top herds are averaging around 6,562 litres 5.02% fat = 319 kg 3.84% protein = 244 kg.

Many top cows are yielding in excess of 8,500 litres with almost 6% fat, 4% protein is not uncommon.

Top yielding cows:

VANDIDA by MUSKAT - 11,378 litres 5.2% = 573 kg 3.77% 416kg fat and protein 989 kg

BAMBI by SERO - 9,522 litres 6.09% = 562 kg 3.94% protein 364 kg fat and protein 926 kg.

Beef Production

Angler bulls are reared according to market demand to weights of 150, 250, or 500 kg live weight. A live weight of 500 kg is achieved at 15 to 16 months under performance test station feed conditions. While no beef units were seen, it would seem that pure bred Angler bulls have no difficulty in meeting E.E.C. intervention standards, (obtaining the variable beef premium from the E.E.C. for cattle of a suitably high carcass conformation standard). Cattle feeders in the United Kingdom have great difficulty in achieving this with Holstein stock.

Exports

Russians are the major buyers of Angler heifers and bulls at the annual sales.

In 1984: bulls averaged 3,518 DM (\$2,345.00)

heifers averaged 2,375 DM (\$1,583.00)

Functional Traits

- Average calving age 27 months.

- Calving interval of many herds is less than twelve months.
- Well attached udders.
- Dairy character
- Few calving difficulties
- Good forage convertors
- Average live weight of mature Angler cow is 560 kg (bull dams 600 kg).
- Average height of mature Angler cow is 133 cm (bull dams 135 cm).

Disease Resistance

Veterinary records kept on all cows. Only cows with a history free of serious disorders are acceptable as bull mothers. This system has a lot in common with the Swedish system.

Breeding Programme

The Angler breeders have formed a co-operative which is responsible for the breeding of future sires through a contract mating system. The co-operative selects and inspects prospective bull mothers, which it has identified from within the milk recording system. These cows are mated to the elite of the proven Angler sires. Elite Danish, Norwegian, and Swedish semen is also used.

Aim

To breed a cow of 600 kg live weight, that from a high forage diet can produce 6,000 litres of milk @ 5% BF and 4% protein.

Selection is made for:

- Fat and protein
- Growth rate
- Fertility
- High lifetime production

Procedure

- 600 cows per year are selected for these planned matings. A bull dam must be over 600 kg live weight and over 135 cm at the withers.
- 200 bull calves are selected for performance testing, where a high forage diet is fed for optimum semen production (not growth). They are kept here to 12 months of age when -
- 20 to 25 bulls are selected for bull proving on growth rate, semen quality and fertility, conformation, mating behaviour, and fat and protein yield of mother.
- 5 or so bulls annually become proven sires from a herd of 35,000.

The first lactation figures for the last generation of heifers, calving age 28.4 months, are:

4,349 litres milk 4.94% fat = 208 kg 3.67% protein = 155 kg.

Summary

Angler cattle are similar in size to the Illawarra. The genetic potential of these cows, with their high butterfat and protein yield from a high forage diet, was most remarkable. I was most impressed by the dairy quality of the Angler cows.

DANISH RED

The Danish Red is a very large, all red dairy breed with excellent width and body capacity. In addition to its high milk production, this breed is noted for its beef production traits.

Origin

Descended in part from the Angler breed, the Danish Red is now farmed under more intensive conditions than its neighbour and distant relation.

Danish Red Today

All dairy cows in Denmark are housed all year round. The high cost of land and buildings to house cattle during the severe Winter, coupled with the increased yields from housed cattle, and high milk and meat prices, justifies the extra expense of all year round housing.

The rumps and udders on the best Danish Red cows are amongst the best seen on my travels. They have "smutty" coloured noses. This does not seem to be a dominant characteristic when mated with other clear nosed cattle - English Milking Shorthorn or Swedish Red. Many progeny have clear noses.

Since 1975, Brown Swiss semen has been imported from the United States of America. Many of the Danish Red cattle seen were heavily influenced by United States bred Brown Swiss. In the breed as a whole these crosses have improved:

- Legs and feet;
- Udder shape and quality;
- Teat size and placement;
- Type;
- Temperament;
- Growth and height.

It is claimed that there have been no negative effects at all. The colour of the crosses varied from red, brown, yellow to almost black. Red, however, seemed to dominate.

A bull with one of the highest and even linear classifications is a Danish Red - United States Brown Swiss cross.

Milk Production

The national production average for over 10,000 Danish Red cows in 1985 was:

6,038 kg 4.17% fat = 252 kg 3.50% protein = 212 kg

Pure bred Danish Red herds averaged in 1985:

6,247 kg 4.16% fat = 260 kg 3.52% protein = 220 kg

Five highest producing cows averaged in 1985:

11,946 kg 5.14% fat = 614 kg 3.59 protein = 429 kg

In 1985, 90% of all Danish Red cows were protein recorded.

Beef Production

In the largest Danish Red herd visited, the majority of cows had mixed

parentage. The policy was to sell no pregnant heifers. It was considered important to explore all of the genetic possibilities. A high cull rate was necessary to facilitate this. Top proven healthy 5 year old cows on their way to be superovulated were seen. Due to the risk of introducing disease to the herd, these cows would then be slaughtered. It must be remembered that these cows are loosely housed in confined and often damp floor conditions all year round. A difficult environment from which to eradicate a disease.

The high price offered for those culled cows that are very well fleshed and finished, make this a profitable exercise.

All the bull calves for beef, are reared on silage and grain. They are sold at 12 months of age when around 500 kg live weight. A third of the farms' income comes from beef production.

Functional Traits

- High production - particularly protein yields;
- Strong legs with dark hooves;
- Well attached udders;
- Good milkability;
- Excellent rumps.

Breeding Programme

A Danish Red breeder appears to have more freedom to select overseas sires than breeders in other Scandinavian countries. As the Danish Red

population is relatively small (approximately 10,000 cows), the breeders have felt it necessary to have the freedom to introduce foreign genetics material to hasten progress.

This has not yet been fully accepted by the more conservative breeders. The range of colours now seen in what was once a red breed, could be part of the reason for their opposition. Within Denmark there is a range of pure Danish Red and Crossbred bulls to select from:

- 20 Bulls less than 12.5% foreign blood;
- 76 Bulls 12.5% to 50% foreign blood;
- 46 Bulls 50% or more foreign blood;

United States Brown Swiss is the major foreign influence.

Procedure

Calves selected for performance testing are tested for growth rate from 1 1/2 months to 11 months of age.

At 11 months, selection is made for:

- Daily gain (average approximately .1300 g/day at average weight of 447 kg)
- Feed consumption
- Area of fillet (Longissimus dorsi - average 63.5 cm).

About 80 bulls annually are selected as test bulls for progeny testing.

Selection is made for:

- Butterfat and protein yield;
- Conformation;
- Workability traits, i.e. temperament, milkability.

5 to 10% become proven Artificial Insemination sires.

Summary

I found the size, strength, body capacity and production of these cows most pleasing.

The ability of some Danish Red bulls to lift and tighten the attachment of the udders of the Blended Milking Shorthorn was impressive.

AYRSHIRE

Type

The progressive and successful Ayrshire breeders of the United Kingdom are aiming to breed a different type of cow to the low set, deep bodied cow with very "correct" vessel - the traditional Ayrshire of the past. The aim now is to breed a taller, more upstanding cow with higher production, particularly fat and protein. Canadian Ayrshire, Swedish Red and White, and Red Holstein semen are being used in small quantities to speed up these changes. The progeny of two Swedish Red bulls being imported by the Ayrshire Cattle Society will be accepted as fully pedigreed. The words "S.R.B." will appear on their certificate.

Breeding Systems

Cattle breeding systems and approaches to breeding are quite similar to Australia, which is to be expected due to our common heritage. Cattle breeders act very much as individuals. This fact is borne out by the range of different types of cow within the breed and between herds. Many breeding decisions in the past have been based more on fashion than fact. The system of showing and judging cattle at shows is largely responsible for this.

Milk Production

Top herd visited 7,262 litres @ 4.28% butterfat 3.22% protein - 528 kg butterfat and protein.

Top cow 14,129 litres @ 4.09% butterfat 3.34% protein - 1,017 kg butterfat and protein.

Mature cow average weight - 550 kg.

Summary

The Ayrshire is not as popular in the United Kingdom as it once was, due to the relatively low value of the culled Ayrshire calf. The value of the British Fresian cross bull calf can be as high as 300 pounds (\$600), while an Ayrshire bull calf may only bring 60 pounds* (\$120).

I feel that the top Ayrshire sires do have a worthwhile contribution to make to the Illawarra.

* February 1986

BLENDING MILKING SHORTHORN

In the late 1950's and early 1960's, a few Shorthorn breeders saw the need to introduce new genes to their breed. Against tremendous opposition they proceeded with an experimental programme to see which combinations of breeds would give them the best results.

They finally settled on a combination of 50% Shorthorn, 25% Danish Red, and 25% Red Friesian/Red Holstein.

There are a few herds that have bred to this ideal very successfully. These blended cattle are breeding on, leaving progeny of the same type with equal or better production than their parents. Cattle of this blend are proving to be at least equal to, or superior to purebred Shorthorn herds in:

- Production;
- Type and conformation;
- Growth rate;
- Mature size;
- Wearability;
- Udder quality, shape, attachment, and teat placement;
- Longevity;
- Feet and legs;
- Temperament;
- Milk composition.

This is borne out by the production records and their show successes. The most recent being in 1986 Royal National Show, where they won many of the major prizes. However, since the rapid decline in the popularity of the Shorthorn breed since the Second World War, this development may have come too late for them.

Production

Top cows - Stowfield Peggy 9:

6,804 litres - 4.07% BF, protein 3.65% = 248 kg lactose 4.55% = 309 kg.

Drisgol Bella 6, classified excellent:

9,288 litres milk @ 4.0% fat.

Top blended herd average:

1985/86 for 103 cows and heifers - 7,470 litres milk, 3.88% fat, 3.34% protein.

Summary

There are quite a few excellent Blended Shorthorn cows whose genetic material could be of great value to us. Their strongest features are their size, strength and large body capacity, and excellent udders. They also offer a blend of genes that may well enable us to achieve in a generation or two what has taken 25 years to achieve in the United Kingdom.

CONCLUSION

Recent research at the University of Guelph in the United States of America shows a zero or negative relationship for body size or weight with milk and butterfat production. They suggest that larger cows were generally less efficient in feed utilisation than smaller ones. If the larger cow does not produce more milk, her extra feed and maintenance requirements become a liability. The only factors in her favour then, is that she tends to give birth to a larger calf and has a higher salvage value.

The medium sized dairy cow seems then, to be most suited to the harsh Australian dairying conditions.

The aim of introducing new genes is to increase economic production. It is most important to raise the fat and, particularly, the protein levels in the milk.

The advantages of this are twofold:

1. The milk payment systems of most countries with surplus milk are changing to fat and protein payments. More emphasis is being placed on protein than fat. With production restrictions in place, this is one way to lift returns.
2. A major cost to the Queensland dairyfarmer is the transportation of

milk from the farm to the factory. This can be as much as 10% of the gross returns from the milk. It makes sense, therefore, to send more fat and solids and less water.

As the world becomes more fat conscious, it becomes harder to market fats on a world market which already has a surplus. Proteins are not burdened with this bad publicity and are easier to market to a health conscious public. It is difficult and expensive to increase the protein content of milk by changing the diet of the cow. It would therefore be wise to start now on the long slow task of breeding high protein producing cows using the best the world has to offer.

If Red Holstein or Red Fresian are used, particular care would have to be taken to ensure that this blood does not dominate or cannibalise our Illawarra breed. Conclusive evidence of the overpowering effects of this was seen in England.

Now that new genes are being introduced into the Illawarra breed it is important to use a variety of breeds. It is just as important to use a number of individuals from within each breed. This will ensure that the potential of that breed is evaluated and the risk of an incompatible individual minimized. Some blends will be more successful than others. It is impossible to predict which will be the most successful blends. It is important that we identify and record what is being used. Use of this information in a constructive manner is needed on a national scale, to maximise genetic progress.

It is inevitable that some minor breed characteristics will be altered in the process of genetic introduction. Our breed rules must be altered so that the genetic progress is not hindered and does not discourage the recording of what has been done.

The selection processes employed in S.R.B. and Angler breeds include choosing cattle with:

1. Production ability - milk, fat, protein and fertility;
2. Higher growth rate;
3. Capacity to use high forage diet;

and perhaps inadvertently:

4. Selection for appetite, which could be the major reason why two genetically identical cows perform so differently.

These traits have been highlighted in the belief that they are of major economic importance to Australian dairy farmers, where dairying conditions are often less than favourable.

I feel that the aim should be to achieve economic production, rather than top production, and the use of cattle whose ability to produce high quality milk from a high forage diet can thus benefit us. Unless we are prepared to make use of the most suited genes available to us from throughout the world, I feel the Illawarra breed could very well suffer the same demise that has befallen the Milking Shorthorns in the United Kingdom. Ultimately however, the decision to carry this out rests with the individual breeder.