

Guernsey Global Breeding Programme

THE PAST and PRESENT

by Digby Gribble

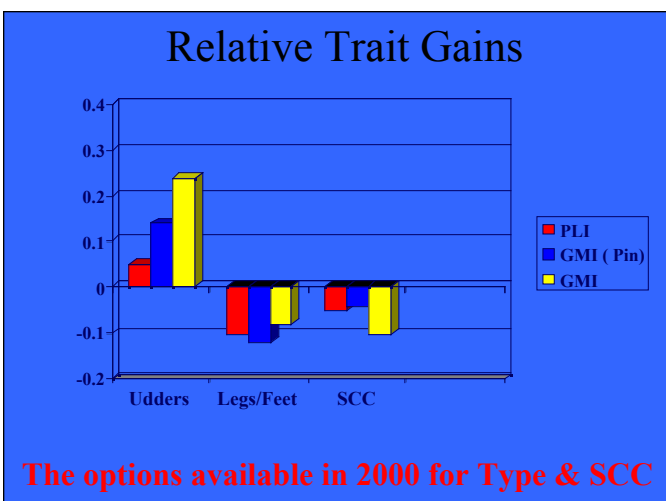
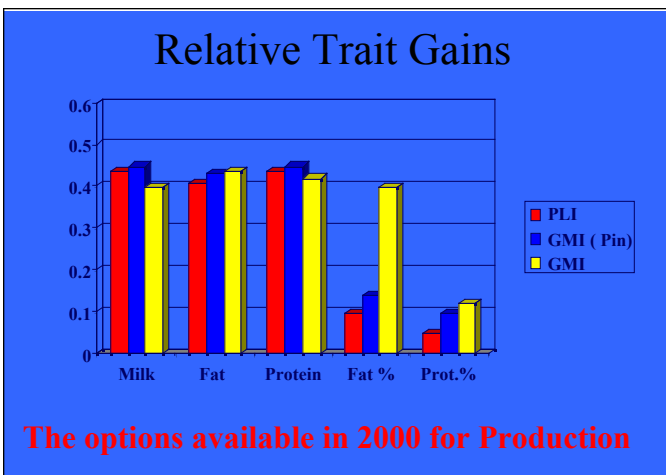
The Guernsey Global Breeding Plan (GGBP) was proposed and discussed at the 2001 WGCF Conference in South Africa by Prof. John Woolliams who had researched Breeding Programmes in the “minority” breeds using data from the British Ayrshire and Guernsey breeds.

Dr Woolliams concluded that the Progeny Test Scheme and subsequent use of Proven Sires was not sustainable in the “minority” breeds and that Genetic Progress was not being optimised by this system.

Dr Woolliams was also persuaded that existing Profit Indexes (PIN & PLI) that had been developed for the “majority” breed were also failing to provide the correct emphasis for Guernsey Breed Improvement.

After returning from South Africa a questionnaire was circulated to all Guernsey breeders in the UK and also to the other Guernsey Associations around the world.

Analysis of the questionnaire results gave rise to a Breed Specific Index, the first for any Breed in the UK and possibly the World and this has become known as the Guernsey Merit Index (GMI).



Dr Woolliams produced a simple spreadsheet in which it was possible to enter the Production and Type Proof Information of Guernsey sires and then to change the balance between the weights given to Milk, Fat & Protein as well as the Linear Composite Scores for Legs/Feet and Mammary.

All of this information is sent on behalf of the Guernsey Associations to Interbull by the National Genetic Evaluation Organisations.

After trying several combinations the EGCS committee that had been set up to oversee this process and had been expanded to include breeders from Guernsey Island agreed an Index that placed 60% of the emphasis on Production and 40% on Type and SCC.

The Breeding Goals as identified from the Questionnaire called for the Greatest emphasis to remain on firstly

Production (Weight of Fat + Protein)

followed by

A restoration of Butterfat Percentages (a key Guernsey advantage)

followed by

Improvement of Udder Conformation and therefore Wearability

followed by

Improvement of Leg and Foot Conformation

followed by

A reduction in Somatic Cell Counts (SCC)

The GMI Index that was selected to deliver the above is = $((\text{Milk} \times -0.4) + (\text{Fat} \times 9) + (\text{Protein} \times 20) + (\text{Legs/Ft.} \times 10.9) + (\text{Mamm} \times 24.3) + (\text{SCC} \times -0.65))$

This was a significant change from the existing UK PIN index which at that time was = $(\text{Milk} \times -0.04) + (\text{Fat} \times 1) + (\text{Protein} \times 6)$

GMI increased the penalty on Milk volume by 10 times to reflect the extra cost of separate collection of Guernsey milk which with Jersey milk has been processed and marketed under the Channel Island (CI) umbrella for 50 years in the UK.

GMI also reduced the emphasis on Protein from 1 to 6 down to 1 to 2 as this reflected the actual Component Pricing in place in the UK at the time as Channel Island milk is mostly used in value added Cream Products.

GMI included for the first time an emphasis on Type Improvements (Legs/Ft and Mammary) and rewarded a reduction in SCC.

Measurement of Genetic Gain

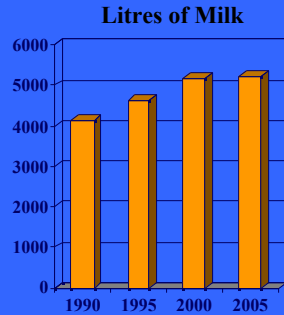
Every 5 years in the UK the Base is updated and progress in Production is removed and the Base (the average production of all heifers born in the Base year) is zeroed.

The advantage of this rolling base system is that the Index numbers that are calculated are not inflated by the passage of time.

Since 1990 the UK Guernsey heifer has increased her Production on average by +26.4% for Milk and +21.5% for Fat + Protein Yields but this has been at the expense of Fat

Changes in PTA Bases

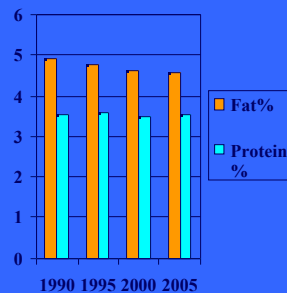
- The PTA Base is the average of :
- Production of all heifers born in the years 1990, 1995, 2000 and 2005.
- Bull daughters are then compared against the most recent Base.
- Currently the 2000 birth group.



Percentages which have fallen from 4.9% to 4.58% but the fall in the last period has lessened. Protein percentages have remained fairly stable over the same 15 year period.

Fat & Protein %

- Fat % Prot. %
- 1990 4.94% 3.51%
- 1995 4.77% 3.57%
- 2000 4.60% 3.50%
- 2005 4.58% 3.55%
- We need to reverse the decline in Fat %, if we are to keep our market "niche"



It is essential that Fat Percentages are restored as the CI milk processor has expectation of a 5% product and whilst a mix of Guernsey and Jersey milk supplies are delivered it will be a 5% product but with an increasing proportion of Jersey Milk being separately processed the Guernsey producers are being left at a disadvantage.

Selection of Bull Mothers

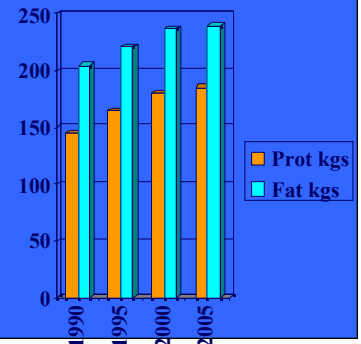
Bull mothers are selected from the quarterly Evaluation runs but are then screened for acceptable Type Scores and Lactation records in particular Fat Percentages (in practice we now require VG Legs/Ft and VG Mammary and better than 4.7% Fat).

I will then contact the Owner and discuss possible matings to produce a "marketable" bull calf.

Agreeing the matings seems to be the easy part of the operation, producing a bull calf would appear to be more difficult as more than 100 Bull mothers listed since 2001 only 33 have produced sons. Of course the heifer calves have potential and have in many cases replaced their dams on the Bull Mother lists which adds more depth to the cow family.

Butterfat & Protein Yield

Since 1990 the change has been +26.4 % for Milk, and +21.5% for Fat + Protein yields.



The successful Dams have a GMI average of +263 and also average 5 lactations with a third of them Classified Excellent.

Average GMI of Potential Bull Mothers

(Figures adjusted for 2005 Base Change)

Cows on List 2001/2002

Cows	Milk kgs	F+P kgs	Fat%	Prot%	L/Ft.	Mamm.	GMI
40	191	19.2	0.02	0	0.57	1.2	189

Cows on List 2003/2004

(17 on both lists.)

Cows	Milk kgs	F+P kgs	Fat%	Prot%	L/Ft.	Mamm.	GMI
43	198	20.5	0.05	0	0.64	1.33	221

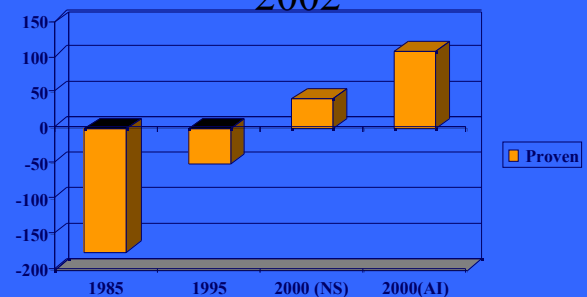
37 Cows on List 2005/2006

Cows	Milk kgs	F+P kgs	Fat%	Prot%	L/Ft.	Mamm.	GMI
37	375	33.1	0.03	0.01	0.86	0.9	319

Use of Sires

I am surprised at the number of sires in use in any one calendar year (110 in 2006) but realise that this maintains variety across the UK population, but more than half of the registrations come from the young bulls selected for the GGBP and used in AI.

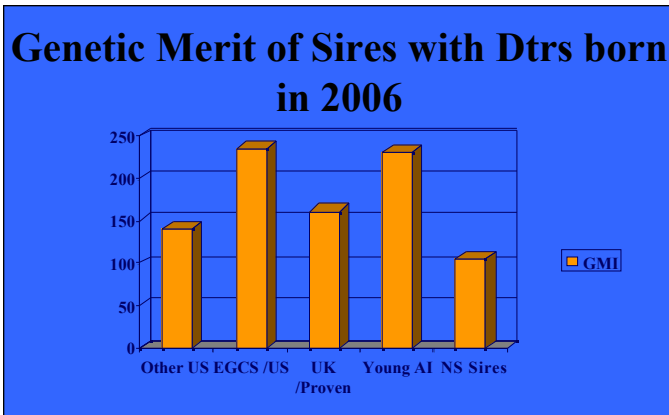
Genetic Merit of UK sires dtrs. born in 2002



14 sires born before 1985 22 sires born before 1995

28 (NS) sires born before 2000 15 (AI) sires born before 2000

I have looked at the GMI's of all sires with progeny born in 2002, the last year before calves of the GMI selected bulls were due. I have then split the sires by age, AI bulls born before 1985, AI bulls born before 1995, NS bulls not used in AI and UK bulls used in AI, the results range from -140 GMI for Group 1 to + 108 to Group 4, 14 of the 15 bulls in this group are plus for GMI, but would not be competitive with the "current" GGBP bulls.



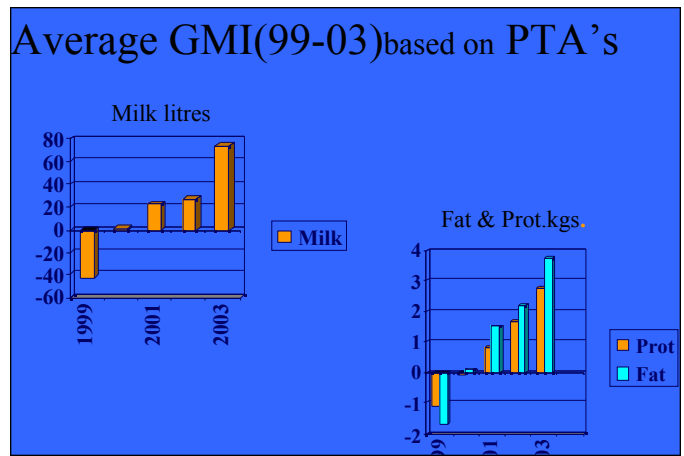
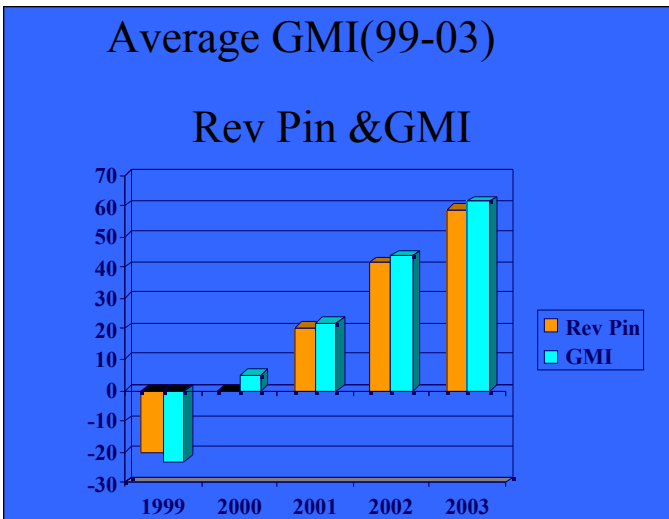
I have done the same exercise for 2006 births but have split the US bulls into 2 groups, those bulls supplied by third parties compared to EGCS selected bulls, the NS bulls not selected for AI and the GGBP bulls, all Groups here are on average plus for GMI

Measuring the Success of the GMI

EGCS were able to get funding from MDC the UK levy body for the development and launch of the GMI and were asked to come up with a way of measuring the progress of the scheme.

It was agreed that all heifers born in each year since 1999 would have their PTA's or Parent Average Predictions for the younger animals published and there is an increase year on year.

The average GMI of all Bulls registered or Imported is also recorded and shows a consistent rising trend, one year 2005 shows a different pattern and further analysis shows that the percentage of heifers by NS sires increased by 13% and this I

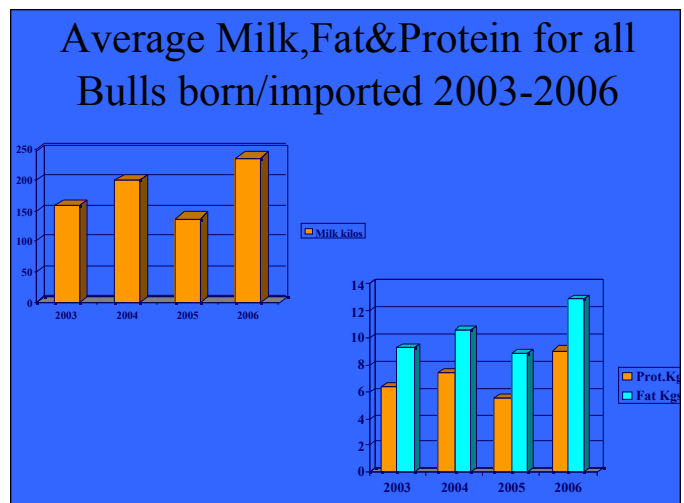


believe reflects the squeeze on Milk prices.

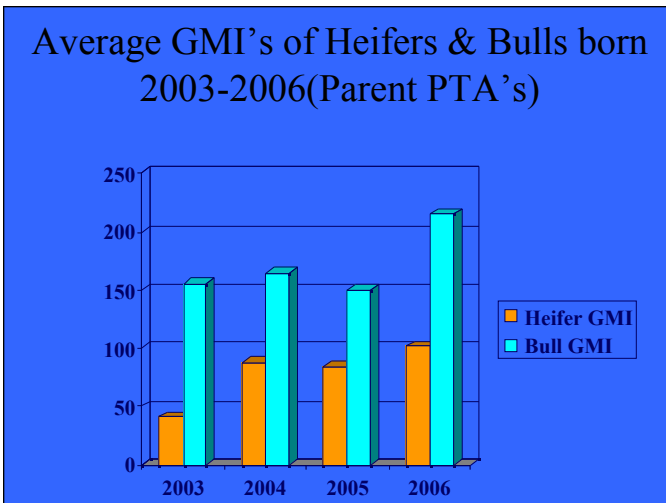


Rising Standard of GGBP Bulls.

With 11 bulls now proven it is possible to compare the average PTA against the predicted Parent Average on which they were chosen and I am delighted to be able to report that on average the 11 bulls have come out with 105% of the Predictions and that Classification of their daughters in 2006 shows the predicted improvement in Type as promised with GMI.



The 25 bulls with semen sold but with daughters not yet milking show a continued rise in all measures as do the 18 bulls available for 2007 and 2008.



GGBP THE FUTURE

by Bill Luff

Firstly I want to thank Digby for a really excellent presentation. I know that we all recognise and applaud his devotion to the Guernsey breed and his determination to make a success of GGBP. In the Pilot Scheme, Island breeders have come to rely on his advice regarding the selection of bull mothers in the UK, just as UK breeders rely on the RGA&HS Herd Book Council for advice on Island matings.

A long time ago, before we even had quantitative evaluations for our Guernseys, I remember the Doyen of Island breeders at the time saying, "You have to understand that one bull will push you forward and just when you think things are going well, the next one will push you back a little - that's breeding." I also remember a leading US breeder telling a meeting that he felt that the breed was "Bumping up against a place that it just cannot get past - rather like a brick wall." In those days we relied solely on the instinct of people who had an indefinable skill in the selection of breeding stock.

Since the Second World War the science of quantitative genetics revolutionised breeding stock selection procedures and this has progressed to the present day with the Test Day Model and MACE giving us very accurate predictions of genetic merit. I believe that all thinking breeders now recognise that there is a far greater correlation with the parent average of genetic merit for type and production in breeding animals' offspring than there is with the phenotype. We have finally put to rest the misguided theory that like begets like.

Genetic merit as predicted by Breeding Values or Predicted Transmitting Abilities is both permanent and cumulative. This proven fact is the basic principle of all modern breeding programmes and is certainly the bottom line of GGBP.

I think that the most important result that Digby has highlighted in the Pilot GGBP is that the Young Sires have on average performed up to and indeed slightly better than their pre-

Averages of Young Bulls (2001-2002)

GGBP Groups 1-3 now Proven

Bulls	Milk	F+P	Fat%	Pro.%	L/Ft	Mamm.	GMI
11	165	22	0.12	0.03	0.3	0.7	238

GGBP Group 4-6 2003-2005 waiting Proofs

Bulls	Milk	F+P	Fat%	Pro.%	L/Ft	Mamm.	GMI
25	270	26	0.06	0	0.2	1.07	259

GGBP Group 7-10 for use in 2006-2008

Bulls	Milk	F+P	Fat%	Pro.%	L/Ft	Mamm.	GMI
18	300	28	0.07	0.01	0.63	1.54	303

dicted genetic merit for type and production. The important words here are 'ON AVERAGE'. This phrase highlights the importance of using TEAMS OF YOUNG SIRES that are chosen to spread the genetic merit of their dams within the population. The theory of GGBP is that these TEAMS of bulls will on average move the genetic merit of the whole population forward, and they are doing just that. A recent survey of young stock on Guernsey Island showed that the daughters of GGBP bulls had, on average a genetic merit of 100 points GMI higher than their contemporaries sired by proven bulls, non GGBP sires.

By limiting the number of straws released from any one young sire we are avoiding the 'Hot Bull' syndrome that in the past has been a cause of the 'forwards/ backwards genetic merit movement described above. We also limit the risk of damage that might be done by having large numbers of daughters from the individual bull that falls below prediction. It is the incremental gain in genetic merit across the whole population that is important, not the performance of an individual bull that might return to sire large numbers of daughters, as in conventional progeny testing schemes.

We are trying to avoid the sort of unfortunate situations that have had adverse effects on our breed in the past. This was highlighted in a recent article in the Guernsey Breeders Journal by Brian Schnebly where he pointed out that a heavily exposed type bull together with his sons had contributed to a decline in butterfat production and percentages in US Guernseys. Our breed is so small numerically that we can no longer afford to have 'hot young sires' and there is also a real limit that must be put on the exposure of sires with a reliable proof if we are to avoid serious inbreeding problems in the future.

What should we be doing if we all really want to make a difference to the future of our breed? I would argue that rolling out GGBP to all our populations is undoubtedly the best way to secure the place of the Guernsey as a competitive modern dairy cow.

If you want to do this there is one fundamental principle that you must be willing to accept. GGBP has to be a co-operative programme. Breeders in your country, wherever that may be, have to agree to work together for the benefit of all. There will have to be a lot of diplomacy and good will. There will be no pot of gold at the end of the rainbow for the individual outstanding bull. Other than small amounts of semen that may be released to countries that have not used him and to breed a few bulls in his home country, there will be no second crop daughters. GGBP is not a bull testing programme - it is a bull using programme, where the sons of young sires should generally be born in the first crop of offspring and will go on to be the next generation of GGBP bulls. A few outstanding proven bulls may be used a second time as sires of sires but generally there should not be more than 20% of GGBP bulls sired by the same sire in any one country in any one year.

GGBP does not mean that you have to start importing semen from lots of bulls all over the world; the complications of health requirements and political situations can throw up all sorts of unwanted barriers to this. It may however be possible for countries with very small populations to run joint programmes provided that health requirements can be met and agreement can be made between programme users. Of course, you will want to select semen from bulls in other populations to sire some of your young sires and to maintain genetic links in order to satisfy requirements for international evaluations. We must remember that resources, that is cows, are far too few on the ground to waste by using young sires in more than one country unless there is a very good reason.

There is no doubt at all that all young sire programmes work. The Late Dr. Harald Skjervold of the Agricultural College in Norway advanced the idea of very heavy use of young bulls in A.I. in the early 1960's, arguing that only a limited volume of semen should be frozen from each sire used. He was able to demonstrate that the results of such a scheme were comparable to the use of a proven bull programme. What such schemes lose in accuracy of prediction, they gain in rate of turnover and a shortened generation interval. Thus, GGBP was able to start with a certain measure of confidence. We were not quite entering uncharted territory.

If you need more convincing, there is a raft of information available from WGCF archives in the proceedings of World Conferences and scientific papers used by EGCS and the Island, some of which have been published in Guernsey World. I am sure details of how to set up and manage a custom processing scheme for young sires can be made available from the Pilot programme.

Guernsey breeders who have not already done so must now realise that they have to take matters into their own hands if they are really serious about the future of our breed. We do not have the luxury afforded to the larger breeds where the activities of competing international breeding companies will secure their future with little input from breeders themselves. There will be breeders who will want to continue to 'do their own thing', but quite frankly we are at a stage when this is a luxu-



A GGBP Bull Mother
Luckley Sylvia 15 VG88 (90/89)
GMI +304 9809kgs 738 F + P

ry that the breed can hardly afford.

GGBP is designed to spread the genetics of the best cows through their sons, so the first thing to do is to identify those cows. I would suggest that you should start by adopting a scientific breeding index that reflects the breeding goals of commercial Guernsey breeders in your country. AGA, EGCS and RGA&HS now all use such an index. When WGCF circulated its first breeding goals questionnaire, the results showed that breeders' aspirations were surprisingly consistent across the World Guernsey populations. If this is still the case, it may be possible for us all to adopt a very similar if not a mutually agreed global index. Geneticists have shown clearly that the most efficient route to animal improvement is through the use of scientifically weighted indices. The weightings used in such indices are decided by the use of complex computer programmes that predict the outcome of using weightings for individual measurable genetic traits in order to match breeders' desired goals. If you are able to do this, you are well on the way to finding the cows whose genetics you will want to spread in your own population. It was a complete revelation to me when I first started to look at our high indexed GMI cows at home - on average they were just the sort of cows that we wanted for bull mothers.

The main steps to rolling out GGBP are:

- To recognise the very special position of the Guernsey breed.
- To recognise that traditional progeny testing programmes are no longer appropriate for our numerically small populations.
- In the knowledge that the Pilot GGBP is delivering very good results for UK and Island breeders, to recognise the importance and suitability of an all Young Sire programme for the Guernsey breed in every country.
- To decide to work in co-operation with breeders in your

home country and across the world in a mutually agreed breeding programme.

- To adopt a scientifically weighted breeding index that will deliver long term cumulative improvement in production and health and fertility traits (including those conformation traits that are associated with this breeding goal).
- To identify genetically superior cows as measured by the breeding index
- To enter their sons bred from high indexing sires into a custom processing programme where limited amounts of semen per bull are released and used randomly across the herds of participating members.
- To closely monitor and evaluate results.
- To modify the programme to include new technology and meet the future requirements of your members.

The Guernsey is an unique dairy cow with an unique product. Guernsey breeders all know this but I often think that it is one of our best kept secrets.

Alongside a realistic and scientific programme that will deliver sustained improvement in selected traits, has to be the development of a market that will deliver added value to Guernsey products.

I believe that there are two angles to this:

Firstly Guernsey milk. There is a small but growing market for milk that gives the public the chance to buy a product that it perceives as different from or better than that available from the commodity market.

We all know that Guernsey milk is better. But I put it to you that the average supermarket customer is not really very well informed. To most people in our modern urban societies Milk is Milk. It takes very clever marketing to convince potential customers that they should pay more for anything unless they are persuaded that it might be considerably better.

There is presently a growing raft of anecdotal evidence available to say that Guernsey milk MIGHT be better for your health. At present I do not see willingness either at commercial, government or scientific community level to pursue this because of the scale, both physical and financial that such research would require. However, many products are sold on anecdotal evidence and even on personal endorsement. I believe that even now we can use the anecdotal evidence that we have as a marketing tool in addition to all Guernsey milk's other proven attributes.

Secondly, we need to think about our Guernsey farms. Is our business just about profitable milk production or could it be something much more than that?

In 1995, Dr. Brian Wickham alerted us to the idea of thinking beyond Guernsey milk and traditional milk products. He mentioned cosmetics, leather goods and fashion items. More recently Guernsey beef has become a speciality after it was voted the best ever by one of the United Kingdoms leading chefs and restaurateurs.

We now have a number of examples around the world where Guernsey farms have created enterprises that add value to their core business by giving consideration to lifestyle, edu-



A GGBP Bull Mother

Tredinney Luxury Essence Ex 92 (91/92)

GMI +282 9056 kgs 4.75% F 3.52% P

Silverado son Endeavour GMI +320 for use in 2008

cation, tourism and environmental issues and combining these with products that are unique to the breed and to the local market.

There is no doubt at all that the modern consumer is becoming very interested in traceability of food products, animal welfare, the environmental impact of farming and because of this, Local Produce. The modern consumer likes to know where, how and when food is produced.

I believe that we would have a wonderful additional marketing opportunity if Guernsey breeders could agree shared farming objectives so that the public associated Guernsey products with beautiful farms, maximum animal welfare and minimal environmental impact.

Finally, the Guernsey cow is uniquely associated with its Island home. Now an international finance centre, Guernsey has retained its rugged beauty and is a popular tourist destination. Environmental, product quality control and livestock welfare standards are higher in Guernsey than anywhere in the European continent. Can this association with all round excellence be harnessed to our global advantage?

Although the Guernsey breed is associated with all the latest developments in the science of animal breeding, we must remember that these technologies are also available to all our competitors. If we are to secure our future, we need adopt a different approach that is uniquely attractive to our customers around the world.

Guernsey breeders cannot rely on others to do this for them. Our breed associations severally and jointly have to do this for themselves.