

# STATES OF JERSEY

## Corporate Services Bovine Semen Sub-Panel Proposed Importation of Bovine Semen

WEDNESDAY, 21st MAY 2008

**Panel:**

Deputy P.J.D. Ryan of St. Helier (Chairman)  
Deputy J.A. Martin of St. Helier  
Connétable P.F.M. Hanning of St. Saviour

**In Attendance:**

Miss S. Power (Scrutiny Officer)

**Witnesses:**

Dr. C. Van Tassell (United States Department of Agriculture)  
Ms. C. Bayer (American Jersey Cattle Association)  
Mr. P. Larson (Viking Genetics, Danish Jersey)  
Mr. R. Gammon (Jersey Canada Cattle Association)  
Mr. J. Godfrey (Royal Jersey Agricultural and Horticultural Society)  
Mr. D. Hambrook (Royal Jersey Agricultural and Horticultural Society)

**Deputy P.J.D. Ryan of St. Helier (Chairman):**

First of all, perhaps I ought to introduce myself and my team here and tell you who we are, which I will do in a second. But before I do that, I would just really like to thank all of you ladies and gentlemen for joining us for lunch today. I appreciate it is very short notice, but we just could not pass up the opportunity of speaking to so many experts on Jersey cows that were here all at one time. So I hope you can understand our motivation and, once again, thank you for at very short notice joining us. So, I am Deputy Patrick Ryan of the States of Jersey. We have Deputy Judy Martin here on my left; Connétable Peter Hanning is here; and our Executive Officer who is looking after the review that we are carrying out specifically on the importation of bovine semen to the Island of Jersey, a major change to our laws and modes of operation in our dairy industry. I am sure probably you are aware of the background so I do not need to go into that in too much detail. Sam Power is our Executive Officer. I think, if you do not mind, I ought to explain that we are being recorded, not because we are going to hold you to account [Laughter] but it is just from our perspective I suspect that there may well be many things that you will say that you will have to forgive us for not fully understanding immediately, particularly if you start getting technical. You know, we understand yoghurt and cream and cheese and things like that, but

when you start talking about the intricacies of sexed semen and all of that kind of stuff, I am afraid you are probably going to lose us. Not that we want to get too much into that technical; what we really need to do is to try and draw from you people that are the experts in your field all of the things that we need to try and find out. The thing about ... what I should probably explain from the outset is that the whole issue of the importation of bovine semen for the Island is an extraordinarily ... it is probably a very long one. It has probably been going on now for God knows how many ... certainly as long as I have been in the States.

**Mr. J. Godfrey (Royal Jersey Agricultural and Horticultural Society):**

Twenty-five years.

**Deputy P.J.D. Ryan:**

Twenty-five years, there you are, James knows better than I do. I suppose for us laypeople, when it comes to the dairy industry generally, we strongly suspect that there is a lot of emotion that is being thrown at us as well as logic. What we want to try and do, our job as a Scrutiny Panel ... I do not want to go too much into the intricacies of Jersey and the way Jersey's Government operates, but we are effectively a sort of all-party Scrutiny Panel which is looking at the proposal that our Council of Ministers has put forward that we do now change the laws and allow the importation of bovine semen into Jersey, and those laws are set in a particular way. As will become clear, there are certain things that are going to be different in our law to, in fact, Guernsey's law, which was in place before the United Kingdom ... I do not want to get too technical again in the history of the law, but before the U.K. (United Kingdom) joined the European Union Guernsey's laws were in place to control bovine semen, so that means that they have certain advantages in terms of their controls that we, in fact, because of competition law, European competition law, we are being told at any rate at this point is going to make it difficult for us to follow the Guernsey model of controlling what they import and what they do not. So we have a number of questions around that area. So I think that has probably set the scene, although, James, I am sure, and David, you know the local scene probably even better than I do, although I am starting to learn a little bit more, but is there anything that I have missed in the background that these ladies and gentlemen should understand?

**Mr. J. Godfrey:**

What springs to mind - I think you have covered it fairly - most of these people here, of course, their expertise lies in the breed and breeding. I think that is where, from my point of view, you would get the most out of them rather than on ... they are not experts on the legal aspects or trade aspects.

**Deputy P.J.D. Ryan:**

No, okay. Would you mind, as I have explained we are being recorded because if there are some aspects that we are not quite sure about and we need to come back, maybe we could email you afterwards and

say: “Exactly what did you mean by this?” and it will help us to not miss anything. To help the recording, I wonder if I could ask you to introduce yourselves so that we can recognise your voice on the recorder, so who said what. Could I ask you if you would do that?

**Mr. P. Larson (Viking Genetics, Danish Jersey):**

Peter Larson representing Danish Jersey.

**Mr. R. Gammon (Canadian Jersey Cattle Association):**

Russell Gammon from Jersey Canada.

**Mr. C. Van Tassell (United States Department of Agriculture):**

Curt Van Tassell, U.S. Department of Agriculture.

**Ms. C. Bayer (American Jersey Cattle Association):**

Cherie Bayer, the American Jersey Cattle Association.

**Mr. J. Godfrey:**

And I am James Godfrey from the Royal Jersey Agricultural Society.

**Mr. D. Hambrook (Royal Jersey Agricultural and Horticultural Society):**

David Hambrook, also from the R.J. (Royal Jersey).

**Deputy P.J.D. Ryan:**

Thank you very much. Let us leap straight in. I think the first bullet point I will go on to here is regarding the safeguards to the pedigree of the Jersey Island cow. The R.J.A.H.S. (Royal Jersey Agricultural and Horticultural Society), you have resolved to only register the offspring of bulls with a pedigree showing that all its forebears have pure Jersey pedigree for at least 7 generations. Correct me if I am wrong.

**Mr. J. Godfrey:**

We have gone further than that, actually. Our process has been the pedigree status of the breeds is managed through a Herd Book system, which is a registry of cattle. Our Herd Book rules up until very recently were written in such a way as really to only encompass animals within the Island, but ahead of any possible opening of the herd, if you like, to imported semen, we changed our Herd Book rules so that now we can register bulls into our Herd Book from imported semen if they have at least a 7-generation pedigree registered in another official registry in another country. So it could be a Herd Book in Canada. Also, that we have certification from the association responsible for the breed in that country that there is no known ancestor of any other breed, and also a requirement on the importer to

submit semen to us which we would send away for D.N.A. (deoxyribonucleic acid) testing and we would again ask the association responsible for that bull in that native country to supply for us a D.N.A. certificate so that we can ensure that there is a D.N.A. match.

**Deputy P.J.D. Ryan:**

Okay, thank you.

**Mr. D. Hambrook:**

In addition to that, Patrick, going back 7 generations, the international standard is 3 generations. So scientifically once there are 3 ... if you have a cow that looks like a Jersey and you then breed for 3 generations with a pedigree Jersey bull, the end product is as pure as scientifically ... that is the sort of international standard it works to. So we felt that we needed to double that. We also, by doubling it and then adding that extra generation, the resultant calf born in Jersey would be less than one half of one per cent of unknown parentage, let alone of another breed. So, you know, the animal landing on the ground is ...

**Deputy P.J.D. Ryan:**

Okay. So first question then - and this is to the other ladies and gentlemen - how many countries would you think would be able to conform to the safeguard and provide the kinds of semen for import that the Jersey ... that the R.J.A.H.S. would be looking for? How much product do you think of different countries would conform to that kind of ...?

**Male Speaker:**

Four or 5.

**Mr. C. Van Tassell:**

Let me answer that question a little differently starting from the largest populations in the world and work down. So the U.S. is the biggest registry; certainly they could.

**Mr. R. Gammon:**

We could, easily.

**Mr. C. Van Tassell:**

Canadian, Danish, New Zealand.

**Ms. C. Bayer:**

Australia, South Africa could.

**Mr. D. Hambrook:**

And the U.K., of course.

**Ms. C. Bayer:**

And the U.K., sorry.

**Mr. C. Van Tassell:**

When you think that is the biggest pots of Jersey around the world, right?

**Mr. R. Gammon:**

And of the marketers of genetics, yes, that are able to.

**Deputy P.J.D. Ryan:**

The next question flows from that. What is your view of the degree of conservative thinking that has gone into that as far as the R.J.A.H.S. is concerned? What would be your comment specifically with regard to safeguarding the pedigree from the Island's perspective?

**Mr. R. Gammon:**

I tend to agree or follow what David was saying, is that you have really doubled standards that many other people would ... you know, in terms of if we are entering a new animal in our Herd Book, we generally would have 3 or 4 generations of pedigree is what we pick up and load. You know, if there is more there, we would load it but, I mean, in terms of what we need for our system, 3 or 4 ... generally in our case we would probably go for 4 generations. So you are, in essence, pretty close to double what we would require as the basic, you know, to get the animal into our Herd Book.

**Mr. C. Van Tassell:**

The only one that I know that is more restrictive is U.S. Holstein, which requires dead-ended North American ancestry I think in perpetuity, that there has to be no ... to be 100 per cent N.A. (North American), which is their sort of gold standard, it has to include only North American ancestry at its termination points or back to Holland.

**Deputy P.J.D. Ryan:**

But that would then stop the importation, so effectively that is ...

**Mr C. Van Tassell:**

But they actually have an additional registry status for non-pure bred, but in terms of, you know, getting bulls into artificial insemination, if it is not 100 per cent North American it is not going to make it. So in terms of genetic progress into the industry, it is essentially requiring 100 per cent.

**Deputy P.J.D. Ryan:**

Just to aid my own understanding of that, are you saying, therefore, that the North American Holstein herd is a closed one around North America?

**Mr. C. Van Tassell:**

Yes and no because essentially much of the elite germ plasma around the world goes very quickly back to North America, so while there is lots of importation of foreign semen, almost all of it comes back to the U.S. or Canada and then back to the Netherlands originally so ...

**Deputy P.J.D. Ryan:**

Thank you.

**Mr. C. Van Tassell:**

Is that your ...?

**Mr. R. Gammon:**

That is precisely the case.

**Mr. C. Van Tassell:**

Okay.

**Ms. C. Bayer:**

Just in practical terms, the 3 steps that they have outlined here would strike our Association and our breeders as being assurance plus, particularly when you throw the D.N.A. testing on top of it. You are taking advantage of the new technology. Assurance plus.

**Mr. P. Larson:**

You would leave a few bulls off.

**Ms. C. Bayer:**

There would be a few left off.

**Mr. P. Larson:**

Yes, but you will have access to genetics from all of those populations that are mentioned here, but there will be a few bulls that are not ... that will not be available but it will not actually limit you in the type of genes that you are getting. You can get all types of genes anyway.

**Mr. C. Van Tassell:**

My perspective is anything beyond that is not a scientific exercise; it is a religious sort of mythical interpretation. That may have some emotional and economic value, I mean, I am not dismissing that, but from a scientific perspective I think there is no question that that requires a level of certainty of Jersey content and the germ plasma that from a scientific and genetic improvement perspective is absolutely sufficient. Whether there is any concern beyond that of, you know, the mystique of the Jersey breed as a marketable icon, I mean, that is not a scientific question.

**Deputy P.J.D. Ryan:**

Okay, thank you. Let us talk about the D.N.A. testing if you would not mind. The accuracy of the D.N.A. testing, are there any issues that we need to consider around this? Is it entirely accurate? How fool-proof are we?

**Mr. C. Van Tassell:**

I guess without a better description of what was in ... it is not clear to me from what was stated what is meant by D.N.A. testing, so is it validation that the animal in question is the animal that it is purported to be, or is it to validate that it is, in fact, Jersey?

**Mr. J. Godfrey:**

Both. I suppose both, really. I mean, ultimately to register in our Herd Book, any bull registered in the Herd Book if it were born locally would require D.N.A. testing along with that of its dam. So, on that basis, its sire would also have been D.N.A. tested, so we would have a D.N.A. profile for the dam, the sire and the individual bull, and there must be a positive match. We send ... how we do that is we send a hair sample with a follicle, so a little bit of skin sample, in effect, goes off to Weatherby's, who are the D.N.A. testing organisation mainly specialising in race horses, and they assess to I think it is 12 markers on a D.N.A. strand to establish the proof of parentage.

**Mr. C. Van Tassell:**

Okay. I am assuming those are probably still microsatellites and not snips?

**Mr. J. Godfrey:**

Yes.

**Mr. C. Van Tassell:**

I mean, without any information, beyond a 12 is ... I mean, my guess is it is reasonably accurate. If I were to make a recommendation to an organisation moving forward, I have encouraged them to move towards snip technology and a larger number of snips, but I think organisations like I.S.A.G. (the International Society of Animal Genetics) sort of endorses these panels for parentage verification in

international trade, that my guess is they are probably a set of the I.S.A.G. markers that are being used. So I think following the lead of that organisation or some sort of international standard, I mean, I expect the U.S. is going to be moving to snips very rapidly for parentage verification. We will develop an internal standard that people will either accept or not, and if we need to go to something additional for international trade we will do that. But I expect we will probably go to 100 or 200 snips pretty quickly at least for internal use for parentage verification. So I think that is much more informative than the number of markers you are looking at.

**Deputy P.J.D. Ryan:**

Okay. To move to that kind of technology, is there anything that would need to be put in place either internationally or through the world breed association or ...?

**Mr. C. Van Tassell:**

There is currently commercial vendors of that type of product on market right now, so I think if that is the desire that certainly can be accommodated.

**Deputy P.J.D. Ryan:**

It can be accommodated. Okay, thank you. I will stop at this point in case either of you 2 guys are ...?

**Deputy J.A. Martin of St. Helier:**

No, I am fine.

**Connétable P.F.M. Hanning of St. Saviour:**

Actually, yes, I think could you ... because I missed the genetics talk, could you pretty basically describe the difference in the 2?

**Mr. C. Van Tassell:**

Yes, absolutely. So, microsatellite is actually ... it is a piece of D.N.A. that has what is called a variable number of tandem repeats, so actually ... let me go to the blackboard. So the most common, you have a chunk of D.N.A. [Aside] [Laughter] So, we have a tag here and a tag here and essentially the idea is we have an arbitrary number of these bits that are very often A.C. repeats. What you do is you amplify using these specific tags, the D.N.A., and then you run it across a polyacrylamide gel and you get bands that are proportional to the number of those repeats. With a snip, it is just a single base mutation or variation that is naturally occurring in the genome and you target that and you get essentially a sequence back from the lab that says: "At this position there is an A; at this position there is a T." So one of the problems with this technology is you get gradients and you get gradients that are not quite clear: is this a size 29 or is it a size 31? And they drift and they are not always standard. With the snips, you get a letter back, bang, bang, bang. It is digital compared to sort of analogue technology so it is much higher



throughput, it is much more high fidelity than the microsatellite.

**The Connétable of St. Saviour:**

Thank you very much indeed.

**Deputy P.J.D. Ryan:**

Judy?

**Deputy J.A. Martin:**

Yes, it was a question I think you might have asked after your presentation. What do you actually ... on your snips and to test it, what do you ... you just said a hair. What do you use? Because you said: "Do not throw away any semen."

**Mr. C. Van Tassell:**

Right. It is actually any source that we can get D.N.A. from, so the labs that are commercialising the tests for us in the U.S. can use blood, semen, hair samples, ear notches, essentially anything, mouth swabs, so anything that you can get genomic D.N.A. from works.

**Deputy J.A. Martin:**

Fine, thank you.

**Mr. J. Godfrey:**

It did actually cross my mind when Curt made his presentation, the immediate thing that came to my mind: out of the 150,000 units of semen that we have in storage, we do have some 400 bulls going back to the mid 1960s, so we could actually thin(?) the population size now, we could get rid of the normal ...

**Mr. C. Van Tassell:**

Correct, exactly, yes.

**Deputy P.J.D. Ryan:**

Okay. Can we talk about the size of the current Jersey cow, the size of the herd and the gene pool associated with it? It is believed by some, not all, that the limited size of the gene pool is an issue for milk production on the Island. I make that statement. I would like you to comment on what you feel about the size of the Jersey herd, its gene pool, its fitness for purpose as far as carrying on in a closed herd way without semen importation. Could you comment on that?

**Mr. P. Larson:**

I would like to comment on that. I have been here several times and the first time I was here I was quite

impressed by the results that the Jersey breeders here in Jersey had achieved with that little gene pool they had to work with. I saw good conformation, good udders, I saw reasonably high production that impressed me, but nothing has happened since. During the last 15 years I have not seen any improvement on either conformation or production. I thought the first time I went back, well, it is just coincidence that they might have used some bulls that did not improve very much. I have seen in some herds better udders and other herds not any improvement. Now, I have only seen herds yesterday, this last time. Last I was here was 3 years ago, but now actually I have seen udders getting worse: not as long lasting, not as strong as they were before, and I have not seen any improvement on production. I understand why Jersey breeders here are frustrated because now you have a brand, now you have a chance of actually expanding your milk production, you will have a chance of getting higher prices, but you do not have a chance of improving on your herd, on production, on udders, you cannot follow the rest of us.

**Mr. R. Gammon:**

One of the things I noticed, that I do not think management of the cows is really that much of a limiting factor here. I would say there are some units here that are managed on the same level of excellence that we would see virtually anywhere in the world. Definitely in our country there would be some people who would be top dairymen in our country, their herds would be averaging significantly higher, I mean, if they were dealing with the cows that we have as well, because of their management finesse. But saying that, I guess I am representing the smallest, the next smallest population, and we run about 10,000 milk-recorded cows, 10,000 or 11,000. We have, even in a population that size, considerable concerns in getting semen from outside. We still have some concerns about the in-breeding level which runs about 4.5 to 5 per cent in our population and the amount of variation we have in the population as well because one of the benefits of a larger population is more variation: you can select better animals at the top end of your population, make them the parents of the next generation. Some of them may excel for production, some of them may be type(?) benefit, some of them may be health and fertility leaders, but you have to have variation to do that there. To kind of concur with what Peter is saying, I have had, I guess, this year 22 years of experience coming to Jersey; I think it is the fifth time I have been here. There has been a definite stall that has taken place. You know, to me the changes I saw were because of the change in management going on here; the production increases when they did happen were because people moved from very small and primitive, lower level management situations to higher level, like the Perchard farm, you know, that high level of management that is there, and the cows, yes, there was an initial burst, I am sure, in productivity there from where they had been, but then I see that flattening out. I was a little scared yesterday seeing some of the herds that we saw in terms of, yes, some of the things, like Peter particularly mentioned the udder strengths, used to be a great strength of the cow here and the teat placement was exceptional and so on, and we are seeing a tremendous change in that where it was concerning and just not seeing ... one of the questions that people asked yesterday was how can people in a commercial situation survive with the productivity of some of these cows and the records we were

seeing? Sure, there were some that were higher and nice solids, but in general that was one of the concerns is how do you pay your feed bill, how do you pay your labour with this amount of productivity per cow?

**Deputy P.J.D. Ryan:**

Okay.

**Ms. C. Bayer:**

I will go because you are the clean-up guy **[Laughter]**. In the United States there was actually a direct experiment at North Carolina State University that can be cited and compared to for this situation. Dr. John Wilk, who designed and conducted that experiment, is actually here. Now, here is what he ... after he looked at the ... were you all in there for ... whose presentation? It was David's presentation. You remember that one graph that showed: "This is what is happening to Jersey milk production." It kind of went like this across time, right, in Jersey. Then you remember what happened to the U.K. It paralleled and then all of a sudden, what, 2001, 2002, it started shooting up, okay? What Dr. Wilk commented later on that day was he says: "That looks like the graph of what we experienced in the Randleigh experiment." Okay, that was the herd, it was called the Randleigh herd. What they did was that they took a group of cows and they separated them so that one herd was maintained as its base as a closed genetic herd. They used a set of bulls that were like the ones that originated it. So it is like freezing it in time as much as you could. Would that be a fair way to say it, Curt?

**Mr. C. Van Tassell:**

Yes.

**Ms. C. Bayer:**

The other herd was called the selection herd, and what they did was they picked the best young bulls by our best indexes at the time. They used them exclusively and what you saw was ... and we have reported this in Jersey Journal, too, so we can find you 2 different ways to ... we can get you a scientific report; we can get you a popular press report of this, okay? It is exactly the same thing had happened. Once you started putting selection pressure on there, expanding your horizons as to what bulls could be considered compared to that original closed herd, production improved and functional type improved. Then that experiment came at a very critical point for the U.S. Jersey Association because we had declined by the late 1970s to the point that we were as an association almost on the verge of not being viable. We were not registering enough animals, we were not doing enough services; it would not have been much more than about 5 years and we would have closed the doors.

**Mr. C. Van Tassell:**

Your farmers were not competitive. That is ...

**Ms. C. Bayer:**

We were not competitive at all. So what has happened since that 1976, 1977, somewhere in there is what we can date, is now - if you saw my presentation earlier - you see where we are very competitive in the United States and actually have increased the efficiency of that cow and given her the tools to be more profitable.

**Deputy P.J.D. Ryan:**

What changed?

**Mr. C. Van Tassell:**

Selection.

**Ms. C. Bayer:**

Selection, yes. Now I will defer to Curt.

**Mr. C. Van Tassell:**

I think they did a couple of things. They started to manage in-breeding more aggressively over time. They placed much more emphasis on progeny testing of broad spectrum bulls and making good selection decisions from amongst those bulls and using them heavily in the industry.

**Ms. C. Bayer:**

At one point in time we were sampling less than 100 bulls. Now, understand that our population is roughly today about a half million registered Jerseys in the U.S. We have 187,000 cows on milk recording. Back then maybe 120,000, would that have been about right?

**Mr. C. Van Tassell:**

Sounds reasonable.

**Ms. C. Bayer:**

So at that point in time, given those numbers, we were sampling approximately 100 bulls a year. We were progeny testing; we were starting them into the scheme; you know, the 5-year very expensive process. Last year we sampled 140 bulls and when we started sampling more bulls, that gave us more opportunity to see the variation between those bulls and sift off the very best ones and then to use them. So selection, it is all about, you know, having more to choose from and then really being focused in on what we wanted to achieve, and we needed more pounds of product.

**Deputy P.J.D. Ryan:**

What was the size of your herd when it was in danger at that point?

**Ms. C. Bayer:**

Well, we were registering 37,000 animals a year.

**Deputy P.J.D. Ryan:**

Even then?

**Ms. C. Bayer:**

At that point in time, but you have to understand, last year we registered almost 80,000.

**Mr. C. Van Tassell:**

And the numbers of Holsteins was dramatic. I mean, you were probably at 1 per cent of the U.S. herd at that point rather than 5 per cent. So while the register of Jerseys has gone up, the numbers of Holsteins have dropped dramatically. So they have just taken a much bigger piece of the pie.

**The Connétable of St. Saviour:**

Could I just ask, you have had this dramatic increase in production efficiency. Has that continued as you have continued your selection from the best bulls? I mean, presumably the improvement rate will flatten out a bit, but has it continued to improve?

**Mr. C. Van Tassell:**

It has actually accelerated, and that is one of the conundrums that animal breeders have been asking for years. In fact, in every population that we look at, you expect theoretically a selection to have its influence, the genetic variation drops and the resulting response tails off. There are mouse experiments where they have gone 100 generations and then that genetic variation just does not seem to plateau until you get to very, very extreme populations. So, trying to understand that is sort of a head scratcher from a biology perspective and I do not think there are any clear answers as to why that is the case.

**Mr. P. Larson:**

That is a matter of what traits that you are breeding for. If you breeding for production, then I cannot see the limit, but if you are going for a wide range of traits at the same time, then you will see production, for instance, flatten a bit out and that is what we are seeing now, putting more emphasis on fertility and herd traits and so on. It is flattening out a bit, but the income comes from milk so we are still breeding from it.

**Mr. C. Van Tassell:**

The other thing that we have been fortunate at is we have never been able to keep the same target for

more than a couple of generations, so I do not know that we are ever at risk for plateauing. Sort of to echo Cherie's point, there is actually a whole body of literature like that in the Holstein breed that talks about, you know, the evidence of selection. In fact, there were a bunch of early research programmes to demonstrate the use of genetic prediction and that it actually worked, so the most striking example was actually at the University of Minnesota where they maintain one of these so-called control lines where it was 1960s era Holstein and it still ... it is one of the few that is still in existence today. I think there is essentially a 2-fold difference in the production levels of those Holsteins. So those turned out to be ... they were essentially created as demonstration herds and now they are exquisitely interesting research animals because of just trying to understand the physiological differences. But sort of along those same lines, I mean, I think the other fundamental example is international trade. The U.S. started exporting semen mid-1970s, late 1970s, across the world because the size of the U.S. population allowed for much more intensive selection and the European herds had fallen behind either because they were not selecting intensively because of a different pricing scheme (essentially the quota system allowed them to be profitable at much lower production level) but it essentially got to the point that that was no longer viable. They did not have the genetic improvement that we had. They blasted U.S. germ plasma into their industries, accelerated their genetic improvement, and now they are exporting semen back because they have learned how to manage that system and use it intelligently and compete using a smaller population and exporting germ plasma back to the U.S. essentially on an equal footing. So the point of that is there is ... if I remember the original rules of steady state populations, I mean, there are 4 ways to change allele frequencies: selection, migration, mutation and drift. So what we are looking at is essentially migration. You are migrating other germ plasma in here to give a quick change in allele frequencies to accelerate the genetic improvement in the cattle here. There is no question if you had an infinite amount of time and an infinite amount of resources you could do it with 5,000 cows, but you are not going to compete on an equal footing the genetic improvement that you can produce from 5,000 cows with what you can do in the U.S. with 10 times or 15 or 30 times that number. The numbers just are against you.

**Deputy P.J.D. Ryan:**

I think just to go back to the original question was the size of the Jersey gene pool, you talked ... not just from being able to ... I mean, you said that if you have enough time and resources you could test everything and select from that but, of course, it is all related to money. But what about the in-breeding and ending up with problems from that perspective?

**Mr. C. Van Tassell:**

Well, in fact, I think ... so that is the drift question and it sounds like there is not much selection going on, but whether there is drift I do not know. I mean, the perception I have from talking to the people in the industry on the Island is that they have done a fairly good job of not over-using any particular line of cow, so they may have the best composition of genetic variation in the breed throughout the world. I

think that is an important consideration. If you stand here right now, probably the most important thing that can be done regardless of the decision that is made here is capture the variation in this population for posterity. Freeze down semen, freeze down embryos, get those somewhere safe. I mean, we have a repository in Fort Collins, Colorado, that I am sure would be glad to act as a back-up repository for germ plasma from the Island of Jersey to get it in multiple locations so that you have a good cross section of very diverse, very important germ plasma for future generations. So if there is some cataclysmic selection decision that we have been heading down the wrong route for 5 generations and realise we have lost something that is very important or we get a disease outbreak that wipes out Jerseys, that there is that resource population that can always be pulled back out of the library.

**Deputy P.J.D. Ryan:**

I think what you are saying is that while the herd is closed we should do that?

**Mr. C. Van Tassell:**

Right. There will never be an increase in variation in this population from this day forward unless it is through mutation, and that is very slow. So you are never going to increase variability on this population other than migration, which you are concerned about actually reducing in the long run because it originates here. So my feeling is you are never going to have more pure variability within the Island of Jersey than you have right now. So I would encourage everybody to consider even if it is just warehousing doses of semen, and there is actually F.A.L. literature that talks about the number of animals that you need to store for a long-term ability to recreate a breed of livestock. I mean, it is not in the order of a few hundred animals and 20 units of semen. I mean, it is not a big effort.

**Deputy P.J.D. Ryan:**

So from the world Jersey cattle perspective, you are talking about insurance here?

**Mr. C. Van Tassell:**

Exactly. I mean, you guys are the keepers of the Holy Grail and it is not that it is your responsibility but I think you feel some ownership, intellectual ownership, of the breed. I think it just makes sense to protect the breed for future mistakes, that it would be a really good thing to take a genetic snapshot of the breed.

**Deputy P.J.D. Ryan:**

We can explore this in more detail. Maybe you do not have the answers right here and now on this one, but obviously there is going to be a cost and what have you associated with that. I suppose what I am saying is can that cost be offset? If that is the thing that should be done, do you think ... what are the chances of a cost off-set on that?

**Mr. C. Van Tassell:**

Well, I think that ought to be a consideration regardless of what decision is made here regarding importation of semen. I mean, we have done it in the U.S. Our A.I. (artificial insemination) companies have donated semen to a repository. In fact, one of the companies donated their historic collection that dated back to the beginning of A.I. so we have germ plasma back to the 1950s on the Holstein breed, so we can recreate the Holstein breed in the U.S. in a ... from scratch and a moment's notice. What I cannot promise but what I can give you pretty substantial consideration is I think the U.S.D.A. (United States Department of Agriculture), the ag-research service that I work for, I am sure would accept that material and maintain it at no cost(?) if it were sent there.

**Deputy P.J.D. Ryan:**

Just like backing up your computer over the internet, is it not, really?

**Mr. C. Van Tassell:**

Exactly.

**Mr. J. Godfrey:**

Can I just try and draw ... there were 2 sort of strands running there that I think it is important to try and draw together, and that is the difference between preserving genetic variability and making improvements.

**Mr. C. Van Tassell:**

You are right, and I think those are 2 very distinct issues.

**Mr. J. Godfrey:**

To make improvement, to a certain extent you are not simply reducing generic variability but you are concentrating on the genes of the best individuals, so there is a sort of a forces pulling against each other in that. This is where it gets ... confusion comes into it when you hear about ... talk to zoologists or, for example, we have some great people at Durrell who have a lot of experience in population management. There is a fundamental difference between managing an endangered species and wild population and our domestic livestock. Wild population management is about trying to keep genetic variability and they reckon they can do that with 200 individual animals; you can keep genetic variability. What our challenge is is to make genetic improvement, and the challenge of doing that within 5,000 animals and to make significant gains in productivity and efficiency without losing the variability, that is where the real challenge is. So it is a fairly complex kind of question and it is not an easy one to answer in one sentence: are 5,000 cows enough, yes or no? There is not really a yes or no answer. If you are trying to make maximum improvement, it is a no.



**Deputy P.J.D. Ryan:**

Yes in one respect, but no in another?

**Mr. J. Godfrey:**

Exactly.

**Deputy P.J.D. Ryan:**

Okay.

**Mr. R. Gammon:**

Can I just throw in something which is very practical and perhaps not as theoretical, but I think it relates to this discussion. You talked about in-breeding and the potential there. We are going to a farm this afternoon of John Le Feuvre. When I first went there in October 1986 John had ... he took us to a field where he had 10 bulls ranging from bull calves to 5 or 6 ... proven bulls, anyway, what we would call proven bulls in his field. That was the modus operandi of the day, you know, you kept your own lines, you kept distinct lines for various reasons. Two things, or 3 maybe: bulls are not very safe, bulls can transmit disease, bulls are ...

**Mr. P. Larson:**

They kill people.

**Mr. R. Gammon:**

Yes, and bulls sometimes can prove not to be very acceptable as sires, but after you have waited a long time to find that out as well. David in his presentation talked about the young sire proving programme which obviously reduced somewhat the number of bulls that were being used in the population because you are committing to this bull, this bull and this bull of 10 or 12 bulls a year. Also, the management changes that I mentioned earlier mean that people do not keep bulls at the level that they did before at all. There is no question that some of the variability goes out of the equation that way and if your population of females is getting smaller at the same time, which it essentially has contracted, number of cows definitely but also number of herds, it is very easy to understand why in-breeding may not have been a concern 20 years ago as much as it might be today, because I do not know how many bulls are registered every year now?

**Mr. D. Hambrook:**

Very few. Last year was about 25.

**Mr. R. Gammon:**

Yes, about 25, whereas obviously at this point in time it was a few hundred. It would have to be if one

herd owner had 10 animals. I dare say we are ... I would be surprised if we saw 2 bulls at John's place this afternoon. I know it is anecdotal to an extent, but it is also representative of what has happened in the population in that time period as well. So, you know, you are quite right, at a variation level it is ... the variation is lost for another reason, not because things are ... you know, we found 6 great bulls and we are going to use them extensively, it is just that they just are not there any more.

**Mr. D. Hambrook:**

We did say, a bit of background data to that, when the bull proving scheme was set out the Society actually did some work to look at the numbers of daughters registered by sire in any calendar year, and it was 7. So, there again, the ability of the ... that was one of the reasons why the proving scheme was implemented because the ability to actually judge any given bull on son or daughters, it is just a non-starter.

**Mr. C. Van Tassell:**

It is a waste of time.

**Mr. D. Hambrook:**

But half of the bulls, there was a review done halfway through the bull proving scheme and it was found because of the farmers' habits of breeding Old Daisy to that bull and the traditional farmer syndrome we will call it, it had actually only climbed to 9, the numbers of daughters per bull. So within this little group of test bulls you had, you had a number of ... as I said in the presentation, there was only 6 or 7 bulls in any group ever achieved enough progeny on the ground. So there was a lost impetus there, but what we are finding now is, I must say, the numbers of herds, of the 28 herds we have, because of the age of the farmer, because of the size of the herd, well over half of those do not keep a bull. The majority that do, the larger herds, they will keep one, possibly 2 young bulls a year. The primary reason for keeping them is not looking upon that animal as their next future herd sire but as a young bull to run with the heifers to get the heifers in calf.

**Mr. R. Gammon:**

Or a problem cow or something.

**Mr. C. Van Tassell:**

It is not for genetic improvement.

**Mr. D. Hambrook:**

It is not for genetic improvement at all. Yes, I mean, when I came back to Jersey, we did a review and so we found that through the scheme you needed 10 inseminations ... I will just take a step back. In the U.K., when I was in the U.K., when you were talking to farmers you could determine that if they

selected 20 cows that they wanted to keep replacements from, you would buy 5 straws of semen to get your one down-calving female heifer. Historically over the scheme you needed 10 inseminations to get that one down-calving heifer. Because when I came back we tried to encourage people to go back and use some of the proven bulls, we are now just about testing 3 young bulls a year but we need 20 inseminations because people are using the cheap inseminations just to get those cows in calf that we are not going to keep progeny from. So at the moment we are going through the motions of testing 3, possibly at a stretch 4, of the very best young pedigree bulls but there is no effort made to actually contract any of them because we cannot guarantee any financial input to the scheme, we cannot guarantee the bull is going to be used. You know, there is no doubt to me that in the last 5 years the Island herd has just been completely in limbo. It has just reached that point that it has tried every scheme that it can think possible ... We have given up.

**Mr. J. Godfrey:**

Trying to run a successful bull-testing scheme on a population this size with the number of bulls involved is like banging your head against a wall. They have done it for 18 years and I think the key leaders of the industry in terms of the forward looking breeders have said: "Enough is enough. We have tried this for 18 years now. We have seen the results from progeny test programmes going on around the world. The way for us to make good gains in our cattle is to buy into those schemes rather than trying to run our own."

**Deputy P.J.D. Ryan:**

Okay. What is meant by in-breeding and a percentage number? I do not quite understand exactly what that means.

**Mr. C. Van Tassell:**

In-breeding is simply the probability that 2 ... so, every place on our genome we have 2 copies of an allele or a spot, we have got a maternal and a paternal copy. It is the probability that those 2 copies are identical by descent, so they come from a common ancestor through our ancestry and land in us but they come from either a great-grandfather, a great-grandmother but they come from one animal or human and they come through our pedigrees on both sides through the maternal and paternal side and are essentially the same allele or same spot of D.N.A. that comes through both sides of the pedigree. So it is the chance, the probability that they are identical inherited from the mother and the father.

**Deputy P.J.D. Ryan:**

Right, so something like 2.5 per cent, which is the U.K. guy, what is he saying when he says that?

**Mr. C. Van Tassell:**

So the probability that those 2 ... any 2 spots in the genome in the average cow in the U.K. is 2.5 per

cent that it is identical. The reason that is important is what happens with in-breeding is you get ... the worst case scenario is you get combinations of deleterious recessives. The most common genetic defects are recessive because if it is not recessive you see it in any offspring. If there is one copy of the gene, you select it and it has gone. If it is a recessive mutation you cannot see it unless there are 2 copies, so it can drift around in a population essentially undetected, but as you increase in-breeding the chance of getting 2 copies of the same gene increases rapidly. So you get genetic defects and you get generally inferior performances in-breeding increases.

**Mr. R. Gammon:**

Maybe Curt could talk a little bit about heterosis, which is the opposite side of it.

**Mr. C. Van Tassell:**

Sorry, the flip side of the same coin is that you have increased variability and essentially the opposite direction of in-breeding is what is called heterosis or hybrid vigour. So if you get lines of animals that have differences in allele frequency you more commonly get a big A, little A or an AB type genotype and that is known historically as being a source of enhanced performance above what you would expect from the parental averages.

**Mr. P. Larson:**

If you allow importation of genes in the future, you need not to take in-breeding into concern, actually, because first you will get genes that you do not have ... genes that are very ...

**Mr. C. Van Tassell:**

Right, low frequency.

**Mr. P. Larson:**

Yes, far from what is here. But we have very good tools to control in-breeding both on the herd level - and you only have 25 herds, you can supply them with their mating programme, all of them, to avoid in-breeding - and on a population level we have good tools as well to ensure that bulls will not be in-bred in the future unless you want them to be.

**Mr. C. Van Tassell:**

Correct. The D.N.A. technologies will make that much easier in the future than it has been in the past. I think you can essentially quantify it in a particular breed that you are interested in in using the tools that are available today.

**Mr. P. Larson:**

But keeping a mating programme for these 25 herds, that would bring success.

**Deputy P.J.D. Ryan:**

What would Jersey's in-breeding percentage be, then?

**Mr. J. Godfrey:**

It was about ... I am just trying to think when they did the last one. It was less than 2 per cent.

**Mr. C. Van Tassell:**

There is an important point here to take in hand and that is in-breeding is relative. You have to define essentially a base population that you say: "This is our zero value of in-breeding." So in the U.S. we define that as 1960 in our breeds. So we say in 1960 these animals were all unrelated. We know that is not true, but that is our definition of zero in-breeding. So to ask that question, you have to define a base, which is sort of a convoluted question but I think it is an important technical issue.

**Deputy P.J.D. Ryan:**

So you do not all work with the same ... there is no common standard on this, is there?

**Mr. J. Godfrey:**

The best analogy is the analogy of high water and low water marks. I think most people have no idea where the measure of high water and low water comes from. We know what it means, we all have an idea what it means, but very few people know actually it is measured from an average of tides in Newlyn, Cornwall between 1915 & 1921. Everything is based off that measure. **[Laughter]**

**Deputy P.J.D. Ryan:**

What lies behind the question ...

**Mr. J. Godfrey:**

Well, in many ways what is important about this is not the absolute, it is the trend. So if the trend is increasing you know you have a problem. If it is stable or decreasing you do not have a problem. That is what is important rather than the absolute number.

**Deputy P.J.D. Ryan:**

Do we have a problem in Jersey?

**Mr. J. Godfrey:**

Currently at the moment, no, we do not. The concern, of course, is how to make that ... to make the genetic gain, and this comes back to population, to make that genetic gain means very intensive selection programmes. The more intensive you have a selection programme the more likely you are to

increase that trend line.

**Mr. C. Van Tassell:**

So almost there is essentially no way with a population of this size to exercise intense selection without selecting a very small number of animals to be paired to the next generation. Then you have a limited gene pool to move forward with, so you almost implicitly are going to force in-breeding within a couple of generations.

**Deputy P.J.D. Ryan:**

So that moves full circle back to is the herd size big enough?

**Mr. C. Van Tassell:**

Correct, exactly. So, I mean, back to the point earlier, to maintain it, if you want to have a maintained, pristine zoo population of Jersey, 5,000 is plenty. If you want to have a productive, competitive, internationally competitive production system that can compete on the world market on milk prices, you are not going to with 5,000 animals.

**Deputy P.J.D. Ryan:**

Okay.

**Mr. D. Hambrook:**

Another flipside to this process with the variation in genetics is the P.L.I. index, which we put up on the chart the other day. That is primarily an index that is created for the Holstein breed within the U.K. as the majority breed within the U.K. and we hang as one of the minor populations off that process. Now, the U.K. Holstein has found that they believe they have gone for too extreme an animal, too dairy, too refined, too tall, and they actually now are proactively looking for more what they call a robust cow. Now, if they have 1,000 bulls from which to select ... the farmers can select their semen, they can put a higher weighting on robustness as a parameter and all it does is it just changes the rankings of those top 50 bulls. So you still have the top 50 most productive Holsteins in the world, but it is actually just pushing the ones that have a slightly chunky look(?) to the top. What we found in Jersey was that we had spent 5 years promoting a group of 10 bulls out of our 50 that are available and what happened ... guess what happened. It flipped the whole lot back up. So we got heavily embarrassed with farmers saying: "Well, you told us to use this bull as a proven bull", but we never expected that to happen because the parameters that were being set are being set for thousands of animals, and it just completely reversed everything for us.

**Mr. J. Godfrey:**

We have a problem here. We are getting very closed to our data that we can generate for animals.

Being a closed population, this data, the reliability of it, is getting to the point where it is almost not worth having it. What David says, we almost misled breeders at some point because of selecting for a particular characteristic. A minor change in something in a small population with little data will completely throw that list awry, whereas in a bigger population it is much more reliable.

**Deputy P.J.D. Ryan:**

Any more before we move off this sort of gene pool herd size subject? Have we exhausted that as far as we can? **[Laughter]** A straight question, which I am pretty certain you know the answer because I have been paying attention to a lot of the presentations: do pure Jerseys in other countries produce more milk than Jersey's Jerseys? I think I know the answer to that, but if we could quantify it I think it would help for the record. I mean, we are ... what is our average herd producing?

**Mr. C. Van Tassell:**

We have export data from people that have exported Jerseys and had them standing next door to North American or British ...

**Mr. J. Godfrey:**

One of the best analyses we use is on book reporting data comparing to here and the U.K. mainland. The reason for that is, you know, environmentally we are similar. Diets are virtually the same. Our concentrate feed comes from the same mills. There have been questions raised about the population sample. Whereas we record all the population, the U.K. it is not necessarily all the population, but that selected population is, what, 30,000 cows? So it is statistically important. But I think you would be best to say what that difference was or difference has been. Those are 2 graphs that David put up.

**Mr. D. Hambrook:**

Yes, basically, you know, 15 years ago there was probably 100 kilos difference on milk between the 2 populations. Then when we saw that dramatic swing, you are talking about the U.S. pushing the genetics out, the Danish genetics coming in as well, it is now 1,000 litres. I mean, it is 20 per cent.

**Deputy J.A. Martin:**

I am probably going back, but I was just reading this book and listening to some of the presentations. Jersey cows obviously round the world I think a lot of them did go from here. Where are we now? You talk about the top 50 bulls. Where is the Jersey Island cow in that and who wants the ... **[Interruption]** you know, this is where I think I need to get my head round and I think the population of Jersey who are interested still think we are ... that you, the rest of the world, want our bulls.

**Mr. R. Gammon:**

The factual data from M.D.C., because they will rank the bulls, you know what I mean, from all the

different populations, and regrettably it is certainly, and particularly on production, I will be quite blunt with you, the Jersey Island bulls are absolutely at the bottom of the heap. To put another answer on your question, our people would not give any consideration to using semen from Jersey Island bulls, no, full stop, would not consider it. They could not. They have to be profitable dairy farmers.

**Deputy J.A. Martin:**

No, I think it is good to ask the question here because the perception, there are people out there that are, you know: “We are still sought after worldwide and why are we not ... you know, do not interfere with our breed”, because we are asking the experts who actually rear the breed in other countries.

**Mr. R. Gammon:**

Yes, and we are kind of answering it in the other sense, is there is no market for the product. It is just not there.

**Deputy J.A. Martin:**

No market, fine.

**Mr. R. Gammon:**

Might as well be blunt.

**Deputy J.A. Martin:**

I think so.

**Mr. C. Van Tassell:**

I think the classic way to describe it for me is sort of a boutique breed. I mean, it has some sort of warm fuzzy connotations but from a scientific and commercial application, I mean, the breed is just not competitive. As I said, there is some mystique that some people put value on and that is a very non-scientific but important question to consider, but from a scientific and genetics perspective this breed is in the dust.

**Deputy J.A. Martin:**

Could this be rectified with importation over a certain amount of years?

**Mr. C. Van Tassell:**

Absolutely.

**Mr. R. Gammon:**

You have some very smart cattle breeders here. I mean, they are good managers as well, but they are



very keen cattle breeders. They have spent time looking outside this population and dreaming about the genetics they would love to incorporate and it will take time, sure, but you will ... you know, 2, 3, 4 generations but sure, obviously. That is how populations improve all around the world: they go after better genetics.

**Mr. D. Hambrook:**

On Monday, after my presentation on Monday, I was talking to one of the U.K. farmers that I knew 5 or 10 years ago. He said: "Surely, David, there must be a way of satisfying the demand for Jerseys in England at the moment, there must be somebody over here that would rear these surplus heifer calves." I said: "Well, we have a psychological barrier. Traditionally, farmers in Jersey either milk cows or they grow potatoes. Due to finances, actually trying to get them to look out the box is quite difficult at times." Historically, people that sort of contract rear female stock for the marketplace, you are sort of keeping a calf that you have to spend all your cash out on for 2 years before you then have a marketable commodity to put into that market. Obviously with foot and mouth and blue tongue there is that element of doubt: do I, do I not? Do I take that risk? This chap came up to me at lunchtime today and said: "Have you thought any more about that?" He said: "I will tell you what, if there is nobody else over here wants to do it, if you are using international bulls, I will come and invest in Jersey and I will rear every single surplus heifer calf for the U.K. market." So that is the demand that is out there but the crunch factor was international sires.

**Deputy P.J.D. Ryan:**

Okay. So, I mean, obviously we can get probably from you guys the data that we need about Jerseys and the production and all of that kind of stuff, okay. Can we talk a little bit about disease transfer? Because that is another one of the items that perhaps emotionally people are worried about. What can you tell us about that? If we lift the ban, do we need to be concerned about disease transfer coming in from outside?

**Mr. C. Van Tassell:**

Yes, but no more than yesterday. You always have to worry about it. I mean, I do not think it has anything to do with importation of germ plasma so ... if you are not worried about it ...

**Deputy P.J.D. Ryan:**

Is there a technical reason that we should ...?

**Mr. C. Van Tassell:**

Well, I mean, the health screening on semen in particular is extraordinarily high. The bulls are tested, the semen is tested. I mean, the rigours of international trade in semen are very highly regulated and the standards are extremely high.

**Deputy P.J.D. Ryan:**

Okay. Catherine Vint was explaining to us yesterday, actually, that most diseases do not withstand the kind of freezing temperatures anyway. There are a couple that do.

**Mr. C. Van Tassell:**

There are a couple that do, and so I think most of the things that are transmitted via semen are screened in the live animal to make sure that it is not ... will not be present.

**Deputy P.J.D. Ryan:**

Okay.

**The Connétable of St. Saviour:**

So the actual animal will be tested before?

**Mr. C. Van Tassell:**

Oh, yes. They are tested on the farms before they go to the A.I. company. They are tested repeatedly in the A.I. company. They test semen routinely. I mean, it is very rigorous to maintain the exportability I think in any A.I. company.

**Mr. P. Larson:**

We cannot mention any cases where we have transmitted diseases with semen, can we?

**Mr. R. Gammon:**

Because, as Curt says, it is all screened in the first place. Healthy bulls are the ones producing the semen.

**Deputy P.J.D. Ryan:**

Was it correct to say that the kinds of diseases anyway you might have would not survive? Is that correct scientifically?

**Mr. C. Van Tassell:**

I am not a veterinarian. I mean, I think there are animal health people that you could talk to, to talk about what diseases are at risk in semen, but I do not think that is a real issue here. I mean, nobody else in the world ...

**Mr. J. Godfrey:**

To put an illustration on exactly what Curt meant, no bigger risk than you have now. Because one of the

diseases that was routinely screened for in semen was blue tongue. We are about to get blue tongue because it is coming from a midge from France. Be here within June, I think. So, climate change, diseases are moving. This is going to happen.

**Deputy P.J.D. Ryan:**

But it is nothing to do with the importation?

**Mr. J. Godfrey:**

It is not the actual act of importation.

**Deputy P.J.D. Ryan:**

Okay, fine, thank you. One of the guys, was it yourself that was telling me? I cannot remember who it was. This is to do now with perhaps competition law and European regulations. If, say, the United Kingdom allows some semen in from a country where the genetic background is not absolutely 100 per cent, was it you that mentioned that there was ...?

**Mr. P. Larson:**

Yes, it was my ... yes.

**Deputy P.J.D. Ryan:**

It was you, was it? Under E.U. (European Union) regulations, have I got it right, under E.U. regulations once one country accepts it and as far as the importation of bull semen is concerned (and I think, James, you would know the answer) we should be looked at as if we were part of the E.U. because of our protocol 3?

**Mr. J. Godfrey:**

Yes, absolutely.

**Deputy P.J.D. Ryan:**

Yes, so we effectively would be an E.U. country. So under protocol 3 we are an E.U. country, so would we have to accept bull semen from the sources that the United Kingdom has? Could that exporter of bull semen ...

**Mr. J. Godfrey:**

Theoretically, yes.

**Deputy P.J.D. Ryan:**

... say: "Why are you not taking our semen?"

**Mr. J. Godfrey:**

There is a presumption of free trade of semen around Europe, so as long as it qualifies to the international standards for health there is no qualitative control on whether it ... what breed it might be or how genetically valuable it might be. There is no qualitative control so there is assumed free trade. So what the Society has said, yes, is we accept that actually any semen could theoretically, if the Jersey law is amended such to adopt European protocol, then theoretically any semen could come in. That is why the industry has taken the burden of regulation itself, if you like, through the Herd Book rules to ensure only we would stop it through our registration.

**Deputy P.J.D. Ryan:**

What about anybody else? If they were not ...?

**Mr. J. Godfrey:**

Well, the belt and braces is that the dairy company, their contracts of supply state that they will only buy milk from herds which are 100 per cent registered in our Herd Book. So you have this belt and braces. So, although theoretically somebody could, they will have to be not of sound mind to do so.

**Deputy P.J.D. Ryan:**

If they ran their own dairy on their own farm, small scale ...?

**Mr. J. Godfrey:**

They could in theory opt out completely of the whole system, but so far we have one producer who has opted out of the dairy but they are still registered within the Herd Book. They market their ... their marketing thrust is all about pure Jersey. The idea of them using anything else is ...

**Deputy P.J.D. Ryan:**

But a renegade could?

**Mr. J. Godfrey:**

Theoretically a renegade could.

**The Connétable of St. Saviour:**

Could I ask you, just following on from that, is there any way you can do a D.N.A. test on the cattle that is producing this milk to say: "Yes, we can verify that is pure Jersey going back so many generations"?

**Mr. C. Van Tassell:**

You can put a probabilistic statement on it. I mean, there would have to be some research done to

compare a variety of animals that you would be interested in. You know, if you had a benchmark that you wanted to compare to a Limousin or a Holstein or ... I mean, it is all ... it is a probabilistic statement, it is not a certainty, but it can be said with very high certainty if you have the population represented that you are trying to compare to. So, in fact, we just went through a discussion with a group in Texas to try to impose a restriction in the cattle show ring in Angus cattle, a genetic test, and it is quite clear that you can absolutely do it provided you have the appropriate data. I do not think it is a difficult challenge to obtain that data.

**Mr. P. Larson:**

If we look at the bulls that we have assembled over the last 5 years in our populations, will there be a problem with any of them? No. I do not think either in the U.S. So there will not be any problem with future bulls so ...

**The Connétable of St. Saviour:**

No, sorry, I am not thinking of that. I am thinking if there was concern in the Island that somebody had imported semen that was not correct or there was a problem, would it be possible to identify it at a later stage, or at least to put it out and say: "This is not pure Jersey" if it was not?

**Mr. P. Larson:**

No, but that kind of semen would not be able ... would not be available on the world market in the future.

**The Connétable of St. Saviour:**

But we have just been told they would be able to import in semen. If someone has brought Friesian in and is using it, not told anybody, and then afterwards we say: "Well, hang on, those cows were a bit odd but he is still selling milk, you know, to his own dairy and saying it is Jersey", you could identify it by D.N.A.?

**Mr. P. Larson:**

Oh, yes.

**Mr. J. Godfrey:**

Another way of answering this sort of renegade, if you like, is just sheer practicality. You saw some of the slides there and the size difference between the modern Jersey and the modern Holstein. If anybody is going to try and cross breed they are going to have to think about rebuilding their barns, rebuilding their dairy parlours because they are not going to fit. So the practicality is just ...

**Mr. R. Gammon:**

Not that it is emotive, but the Jersey people here are really committed to the Jersey breed. You know, whatever view they have on this issue, they love the Jersey cow. I do not want to get into emotion, but you know what I mean. They are very committed to and proud of the Jersey cow.

**Mr. C. Van Tassell:**

Well, the fact is their market is driven in part by that added value.

**Mr. R. Gammon:**

Yes, sure, absolutely.

**The Connétable of St. Saviour:**

The problem we have is that there are very strong emotions in this and all these issues are being raised and I would like to get it on record from you that, you know, it could be identified.

**Mr. R. Gammon:**

Sure.

**Mr. C. Van Tassell:**

I think it would be very difficult to put a Holstein in Jersey clothing and get away with it.

**Ms. C. Bayer:**

I guess I come back to this other one. If we do not mind for a second I want to explore this because I wrote down here: what is the advantage to going outside the rules as you have them for the Herd Book? Let us say somebody does. You will not register the calf, so yes, they could do direct marketing off the farm, right, because there would be no restriction on that. But they are going to have ... they are going to have something they cannot sell as a registered Jersey. They would not be able to export it because it would not have papers. There would be no incentive. There would be no added value there because of that one single step.

**Mr. J. Godfrey:**

That is right because, in effect, somebody who wants to sell ... say somebody wants to sell an animal off the Island, to export it, if they want to register it into another pedigree association that association will only accept it if they have a certificate from us to say that it is what it says it is. So these are international registries. We work together on that kind of thing. There are protocols for transferring information.

**Mr. C. Van Tassell:**

Right. I mean, in each country the breed association is the umpire that has the last word on whether an

animal is breed true or not. That is the authority that is granted each of these individual organisations, so there is not any question about that. So if you do not recognise it as a Jersey, it is not a Jersey leaving this Island.

**Mr. D. Hambrook:**

As an example, one of my roles in the U.K. was going round to Farmer John with him saying: “Look, I have an animal here. I bought it at the local market. I think it is a Jersey. What do you reckon? Could we bring it in as a grade animal?” I used to visit one large herd in Yorkshire, milked over 400 cows, and the herd had started with 4 or 5 Guernseys just after the Second World War. They had bred up and they still had animals in the mid-1990s that still looked more Guernsey than they did Jersey after possibly 7, 8, 9, 10 generations. They just stand out at you. I mean, it is so blatantly obvious that they are not a Jersey, so I do not think, especially within the confines of the Island ... I mean, there is a bull running round Jersey at the moment called Romeo. Now, he is black and white. The first day he was put out in the field with some heifers, we actually had a photograph of this bull emailed to us seeking comment on its breeding. With DNA validation of the parentage we were able to confirm the pedigree immediately. I believe it may have also come as something of a shock to the person making the enquiry that the bull was owned by someone not seeking the importation of semen and that the pedigree of the bull contained bloodlines used within the enquirer's family herd, but it is...

**Mr. C. Van Tassell:**

Well, I mean, the pragmatic response to that is so what if somebody wants to start up a Holstein herd? Does that diminish the value of the Jersey? I mean, the fact that there are black and white cows in a corner of the Island, is that a risk?

**Mr. J. Godfrey:**

It is a political risk. **[Laughter]** From the purpose of the people we are talking to here, the thing that I think they all agree with is what establishes purity is pedigree. It is the system of pedigree registration, identification, that is the integrity of the whole system.

**Mr. C. Van Tassell:**

There is a scientifically recognised way to establish that and provide credentials that that is, in fact, accurate. Whether it is D.N.A., whether it is blood typing, there are a variety of means that you can say: “This animal is, in fact, the offspring of the animal that it is purported to be and, therefore, we can establish its identity as a Jersey.”

**Deputy P.J.D. Ryan:**

Yes. I think we have a pretty clear message that it would be pretty pointless, to be honest. They would not be able to sell the milk, they would not be able to export it, it would look odd in a field but that is

about all. So from a practical and from a commercial perspective, I suppose from a complete renegade who just wanted to be bloody minded politically, someone could do it, but now we are getting into legal issues as to how we would stop that and I do not think that is in your sphere, really.

**The Connétable of St. Saviour:**

And some might want to do it for beef. There could be a small market with ... across Jersey for beef ...

**Mr. J. Godfrey:**

The area that we come from, this is very much outside these guys' remit, but the area that we come from on this is that we are pretty confident that the law as it stands is contrary to the protocol 3, European free trade as it is, because bovine semen is an agricultural product and there should be this free trade in agricultural products. So if somebody was going to be really bloody minded and had a really deep enough pocket, they might just do it anyway and challenge the law. Now, our whole philosophy of life is about integrity and doing things by the book, so what we are trying to encourage is this idea that although there is always risk in life to some degree or another, the positive benefits of this far outweigh any potential negatives but the important thing is it is done within a regulated system.

**Mr. C. Van Tassell:**

And you are self-policing this, actually.

**Deputy P.J.D. Ryan:**

Can we talk a little bit about the different standards used to value animals? In Denmark, for example, Jerseys produce milk with a high protein content, but in America you have higher milk production abilities, is that right?

**Ms. C. Bayer:**

Yes.

**Mr. C. Van Tassell:**

But still high ... I mean, much higher solids content than Holsteins.

**Deputy P.J.D. Ryan:**

Yes. I am just wondering what ... the question is what consideration would we need to give in the Island if we are importing semen? What implications do these differences make?

**Mr. P. Larson:**

Your farmers need to look at your price structure. What is the price of your milk? What is the price of veterinary costs? What is the price of meat? What is the price of labour and so on? What would fit



best? What would make the highest profit for you as a Jersey Island farmer?

**Ms. C. Bayer:**

I was going to say end product value. What is my market? If I am producing for cheese and I know that I am going to be paid X amount for that cheese milk if I meet to that standard, then I am going ... okay. If I am going to yoghurt, that can have a totally different value of the milk.

**Deputy P.J.D. Ryan:**

So you would breed a cow to be different for those ...?

**Ms. C. Bayer:**

We have done that.

**Mr. P. Larson:**

Oh, yes, sure.

**Mr. C. Van Tassell:**

In fact, in the U.S. we produce 3 different net profit functions. I think ... to disagree with Cherie a little bit, I think it is profit that is important, not necessarily total production. So it is cost of producing that product and the value of the product that you produce.

**Deputy P.J.D. Ryan:**

In terms of the value of the pedigree that we have or do not have at the moment, whichever way you look at it, is there some implications there that we would compromise the pedigree by, say, because everybody wants to breed for either liquid milk or something? Would we end up with a very good Jersey or is there a pedigree point of view which says at the moment we have the best all-rounder that can go any way, any direction?

**Mr. C. Van Tassell:**

My vision is I think you guys can still stand at the top of the hill and say: "We know the genes that we are bringing back into this Island originated here", just like the Dutch could stand with the U.S. Holstein that they brought in. They know that the genes in those animals came from Holland originally and, you know, with the purity requirements of the breeds that you are bringing back, you are bringing back your own D.N.A. essentially.

**Deputy P.J.D. Ryan:**

I suppose the political thing would be, you know, here we have a lot of Jersey farmers that naturally want to make more money and can produce more milk and earn more. Are we going to end up with a

Jersey herd that is spoilt, that's pedigree has been compromised for commercial reasons?

**Mr. P. Larson:**

We do not consider our population spoilt. Cherie's population, the Americans have been ...

**Deputy P.J.D. Ryan:**

There is a very insular respect to this that we have, but nevertheless this is the politics that are we talking about.

**Mr. C. Van Tassell:**

In fact, that is one of the reasons why I think it is important for the security blanket to put away some of this germ plasma, that if you feel that you guys have made a mistake politically you can backtrack. I mean, if you freeze embryos you can go back to a 2008 Jersey in 10 years and say: "We made a mistake. We are going to go back and pull those embryos out of the liquid nitrogen, implant them in cows and we are going to step back to where we were and pretend that we never did this."

**Deputy J.A. Martin:**

Actually, if we believe the counter argument that if we do not import bovine semen that giving it 5 years we will lose the entire herd, it is something as you said earlier we need to do anyway because this could be a decision either way, you know. Do it and be damned, do not do it and be damned: we have the pure Jersey there back in the fridge somewhere.

**Mr. C. Van Tassell:**

That is right. I think from a sort of world population perspective it is almost ...

**Deputy P.J.D. Ryan:**

Our responsibility.

**Mr. C. Van Tassell:**

That is right. As the curators of the breed, I think it is. If you have to reach out to other people to help fund it, do that.

**Deputy P.J.D. Ryan:**

Okay, yes.

**Deputy J.A. Martin:**

Thank you.

**Deputy P.J.D. Ryan:**

So the different ... the last question I have, I think, is about animal husbandry and techniques used in other countries, uses of hormones and things. Does this have implications on our breed or are we talking about really a sub-set of what we have already been talking about here?

**Mr. C. Van Tassell:**

I think it is just like disease. I mean, I think the issues that your producers face everybody is facing and, you know, that is a regulatory issue within Jersey. Whether you allow particular pharmaceutical or other management intervention to be used is completely outside the issue of whether you allow importation of semen.

**Deputy P.J.D. Ryan:**

Okay.

**Mr. R. Gammon:**

One example might be, you know, we have a long border between Canada and the United States. Bovine somatotropin is not used in Canada. It is used in the United States. Nobody gives any consideration to that that I understand in terms of the genetic evaluations in either country or would even give it a second thought. It is because genetics you are measuring ... **[Interruption]**

**Deputy P.J.D. Ryan:**

That is separate from ...?

**Mr. J. Godfrey:**

There is a big difference between actual physical performance and genetic merit. Genetic merit is a relative term, so you are looking at what is best amongst its peers, not whether absolutely how much ...

**Deputy P.J.D. Ryan:**

Yes. I suppose we could ask you, James, as to what controls Jersey already has legally to control these kinds of additives.

**Mr. J. Godfrey:**

That would come under E.U. regulations. B.S.T. (bovine somatotropin) is not used here.

**Deputy P.J.D. Ryan:**

So E.U. controls are in place to cover all the gaps, issues?

**Mr. C. Van Tassell:**

Yes. I think the way that one could interpret that question is, is there evidence of genotype by environment interaction? Are the bulls that you are going to import into Jersey going to perform the same way here that they do where they come from? That depends in large part about where they come from. If they come from New Zealand, probably not, but there are interval evaluations on the U.K. scale that are probably comparable. So the information from the U.K. has probably got essentially no genotype by environment interaction. The bulls will perform on the Island ... on the English side of the Channel as well as they will here by and large, so I think from that perspective you have an ideal situation where you have a population that is almost identical in environment so you can select using the standard genetic predictions in the English side of the Channel and know that they are going to perform pretty similarly here.

**Deputy P.J.D. Ryan:**

Just a further sort of question on that, a supplementary, Catherine Vint said that when she transported her whole Jersey herd to the U.K. the first thing she encountered was a whole range of diseases. I think we are going back to the disease question we asked before. Does that sound right to you? Would you have said that that was the case or was it something else?

**Male Speaker:**

They were down for about 18 months, were they not?

**Mr. C. Van Tassell:**

Moving cows is stressful. Cows do not like to be moved. So yes, they will take a hit. They will be more susceptible to disease. There is shipping fever that is fairly common as a by-product of moving cows, so they are going to take a hit in production and they will typically come back.

**Deputy P.J.D. Ryan:**

Just when you said they work the same ... over the other side of the English Channel as here, I mean in diseases ...

**Mr. C. Van Tassell:**

Right, but an animal that is born on this Island versus an animal born on the island in England are probably going to perform pretty comparably with the same D.N.A. So that is a much different question than if you move cattle, what that movement causes them in terms of stress.

**Mr. D. Hambrook:**

The problems that the Vints encountered were very much specific to the farm that they went to. As a company, when we are involved in shipping animals out - the last load that left Jersey was a lorry herd of young stock that were headed up towards Scotland - the first thing we do, along with our terms of

business and everything else, we send them a list of things saying: “The Island herd has an extremely high herd health status. We are blessed with very few diseases. Having said that, because of that, when the animals arrive with you, we suggest you do A, B, C, D.” So it is an animal management process. I was actually ... I was in the U.K. at the same time that the Vints actually moved to Hampshire and what they encountered was very much specific to the farm that they went to.

**Deputy P.J.D. Ryan:**

Okay, fine.

**Deputy J.A. Martin:**

No, I am fine, thank you.

**Deputy P.J.D. Ryan:**

Have we exhausted every grain of intelligence from you guys?

**Male Speaker:**

We are only just warming up! **[Laughter]**

**Deputy P.J.D. Ryan:**

Sam, have we missed anything?

**Ms. S. Power:**

No.

**Deputy P.J.D. Ryan:**

Well, okay, it then remains for me to once again thank you all very much for joining us today. It really has been most appreciated, and at such short notice. It is extremely valuable that we have been able to get the collective wisdom, either recorded or on paper. Thank you very much and enjoy the rest of your stay in Jersey.