HCC Scholarship

2012

Lamb grading systems and payment methods in America and France

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August 2012

Contents

Objectives of the study:

To better understand alternative grading systems in different countries and to see if there is any value to changing the current system in Wales, and if so, what changes would be best.

Background

I am a sheep farmer's daughter from Llanddewi-Brefi, Ceredigion. I have always had an interest in agriculture, ever since I asked my Dad if I could have a pet lamb back from Oriel because I wanted to see what he tasted like. I graduated from Harper Adams in 2003, and have recently enrolled as a part time Masters student.

My current role as Partnership and Livestock Manager for Lamb at Dunbia (Llanybydder) requires me to build relationships along the supply chain, which means that I have involvement from farm level through to the retailer.

The reason I decided to study lamb grading is that I am very aware that grading is often brought up as a topic of discussion between farmers and processors, and I believe it to be an area where the meat industry should develop in order to progress. There is a lot of technology in agriculture, from machinery to Electronic Identification of animals. There is also technology in the processing plants and I believe that introducing some form of it to the grading station could be of benefit to all parties.

The current system is to select the different types of lambs and identify them for different customers, this is based on conformation and fat levels, and lambs are paid based on the EUROP grid. If the industry could develop the grading stations to be less subjective, and to accurately assess the carcass yield (Meat, fat and bone ratio) then the farmer would know what is best to produce, the processor would be paying for the quality they are receiving, and the end customer would have access to a desirable product at the most efficient cost. There would be more clarity from the farmer through to the end customer.

I chose America as the main focus of my study as upon reading I discovered that they grade and pay suppliers based on yield and quality. I realise that America is not a large sheep breeding country, but it is the grading methods they use that I am interested in seeing.

France was another part of the study because some factories are using Visual Imaging Analysis (cameras) to grade their lambs, and I wanted to see this in action, and understand the farmer and processor opinions on this system.

Lamb grading in France

The map below highlights the area I visited, the town was called Gramat, which is North of Toulouse.

Lamb grading in France

Introduction

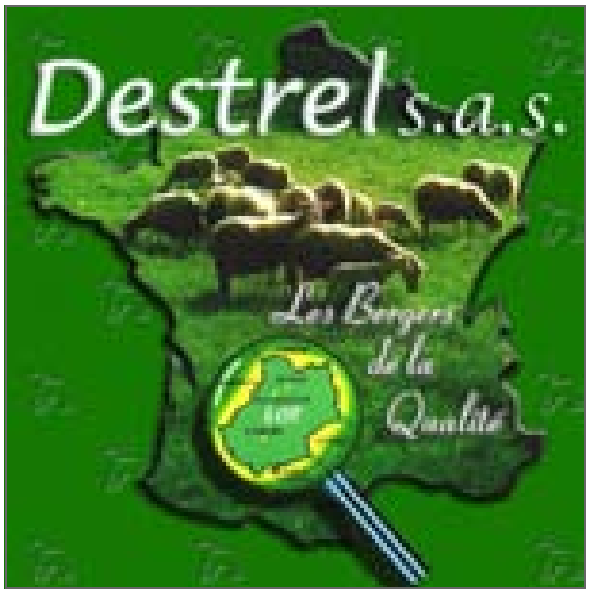
France, as part of Europe, use the EUROP grid for grading and payment systems, just as we do in Wales and the UK. The reason for visiting France was to see the VIA cameras in action, and to see what the processor and the farmer thought of these.

VIA cameras take a photograph of a carcass, and the photograph can measure the conformation and fat levels of the carcass—this is what we are told, but is it true and what are the result of using this technology?

Getting to visit a factory in France proved to be rather difficult, I went through all avenues I could think of, and was about to give up when ETS Destrel in Gramat near Toulouse, gave me the okay to visit them. The reason they gave for not wanting me to visit was that I was competition from Wales visiting French plants to see their technology.

ETS Destrel

Phillipe Destrel and his brother are the previous owners of ETS Destrel but they sold the business and now manage it for the new owners. This has meant that although they are still running the company, there is a lot less stress involved, which has been better for them due to health reasons.



My stay in France was brief, due to the timing after the difficulties of securing a visit, but I had enough time to question the brothers about the VIA technology and to see it in action.

The plant in Gramat (North of Toulouse) kills approximately 1000 head per day, approximately 260 per hour, there are plans in place to extend the retail packing and despatch side of the business in order to provide better services to customers. The plant is an ovine only plant, and of the 1000 head per day 70% are lambs and the other 30% are ewes.

Visual Imaging Analysis

There have been studies on the use of visual imaging analysis within the lamb industry, including a trial in Welsh Country Foods. Following reports and conversations with people in the industry, I understand that the camera is able to read the conformation well (subject to any skin damage) but struggle more with the fat level. When a lamb gets to a certain fat level, the fat starts to become intra muscular rather than inter muscular, could this be the difficulty for the camera? Having read and heard about the VIA camera grading, I looked forward to seeing it in action.

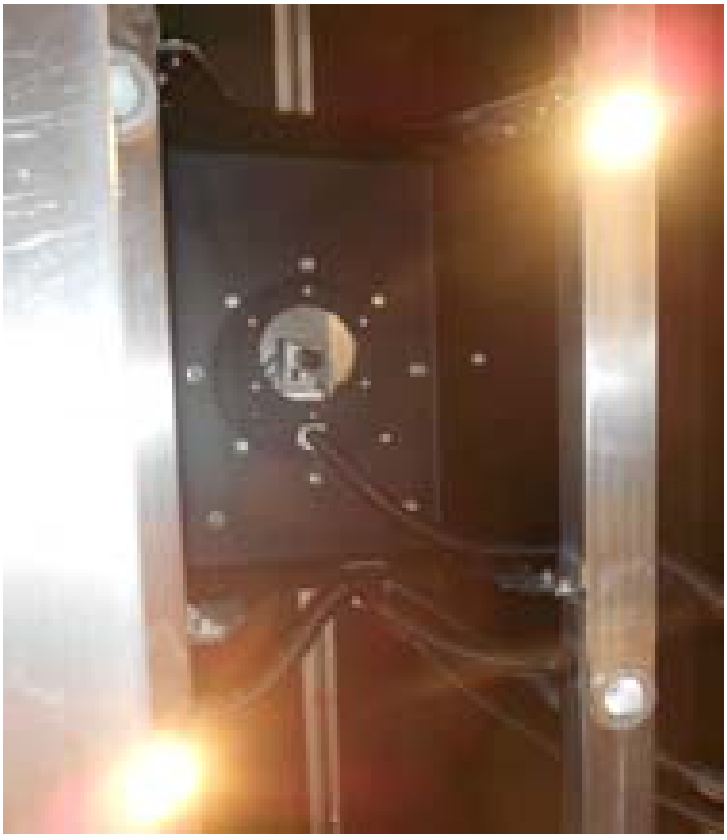
Lamb grading in France

Below are photographs of the VIA grading machine in ETS Destrel (the second picture shows the camera inside). The carcass will stop in front of the case, while the camera focusses and takes a photograph. This image is then transferred to the computer system, and the yield will automatically come up on the screen. At the moment, Phillipe believes there is more work to be done on the technology side, as there are still graders checking and amending the grades the VIA machine reads. He feels that although technology is developing the casing around the camera isn't designed well enough for withstanding factory conditions, mainly due to the washing down which is vital.

The payment system in France is per kilogram and they run a grid for different fat classes. The carcasses we saw were lean, and of very good conformation. ETS run quality schemes which would mean a premium being paid to the farmer if they qualified for the programme, the same as we do in Wales.

This is the only factory where I have seen female graders, the brothers felt that females are better at grading, I don't know what the science was behind this is, but it worked for the plant in Gramat.

The casing built around the camera



The camera inside the casing

Meeting Farmers:

During my visit to the plant I was able to meet some farmers as they brought their stock to the lairage. I was surprised to see trailers without covers, and one was being towed by a Citroen car.

On a personal note, I was rather nervous to speak with French farmers, their reputation precedes them. However, once Monsieur Destrel had explained that I was not an inspector of any description, their manner towards me changed instantly!

While speaking with a farmer who brought his stock in, I discovered that he had invested in Electronic Identification as he felt that it could be of some benefit as a management tool. With regards the camera reader he felt that it was a positive change, but didn't trust it enough yet to wish to be paid from the yield readings. If the technology developed, however, then he would be happy for payment to be based on yield, from the camera reading. He was concerned however about the grading staff losing their jobs, and wished for them to be employed elsewhere in the plant.

This farmer was also in favour of the yield payment system because of his investment in to EID as it would give more detailed feedback and help him with on farm management decisions.

This was the general opinion of the farmers I spoke to at the plant, though not all were concerned with the graders employment. It is producers who have pushed for the VIA machine to be used for grading in France, and ETS Destrel have invested in these facilities due to their suppliers' drive. There is another reason for this, and that is that suppliers also want information back so they can improve their produce, I was very impressed with these attitudes, and their openness on the topic. The second reason is that many of the farmers do not trust the graders and the reading is up to an individual.

The yield payment system needs to determine an acceptable yield level for legs, loins and shoulder, then payments can be allocated against a percentage of meat yield.

Example of a yield reading:

Total yield 87%

Legs 31%

Loins 39%

Shoulders 16%

On the EUROP grid this lamb graded as an O3

Advantages

- Potential accuracy of camera reading
- Attitude of processors and suppliers towards developing the equipment
- Developing with yield readings, so moving away from the EUROP grid

Disadvantages

- Only one plant was visited, would be interesting to see the attitude further afield
- Technology is not keeping up with the drive to get this done

Facts and Photographs

- Lambs were 6 Euros/kg , the premium range (label rouge) were 7.20 Euro /kg
- Out of 1000 animals killed per day, 30% are ewes and 70% are lambs.
- VIA machine is only used on lambs, the lamb has to be straight so that the camera can take an outline photograph.

Ile de France lambs are a local breed and are regional to Gramat this allows them to qualify for the premium range sold by ETS.

Philipe Destrel talking to one of his suppliers

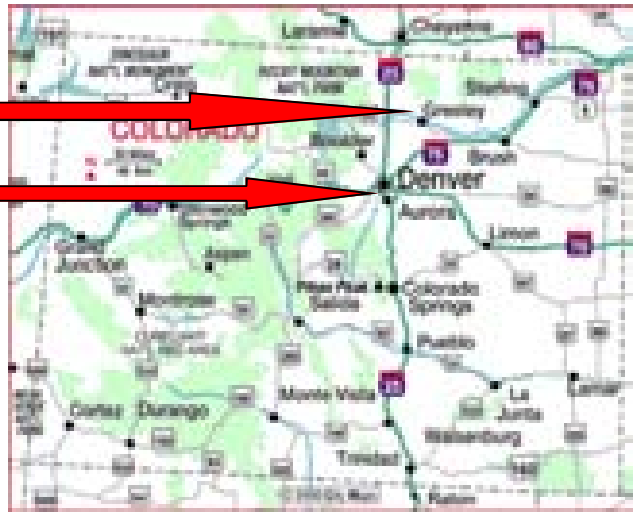
America

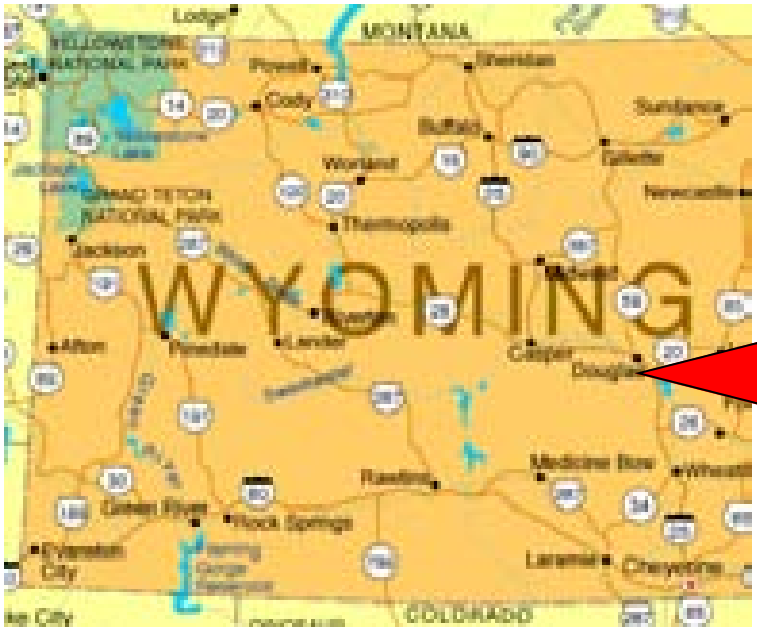
The states we visited in America were California (CA), Colorado (CO) and Wyoming (WY). We travelled by train and internal flights as there was a lot of distance to cover in the time we had.

Davis, California

Greeley, Colorado

Denver, Colorado





Douglas, Wyoming

American Lamb

The American lamb industry is not strong at the moment. The price is low after it reached a peak last year. The high price last year meant that lamb has lost shelf space in the retailers, and menu space in restaurants. With the food service sector being very important in America, the lack of lamb on the menu has meant a lot of stock has not yet been sold. This is causing a cross over with old and new season lambs which is a bad situation to be in, regardless of the stage of the food chain you are in. The price of American lamb also resulted in Australian lamb being imported as it is much cheaper.

The weather this year has been very dry so far, which means that areas that don't sit in irrigation stretches are suffering due to lack of grass growth, and the stock then suffers the consequences.

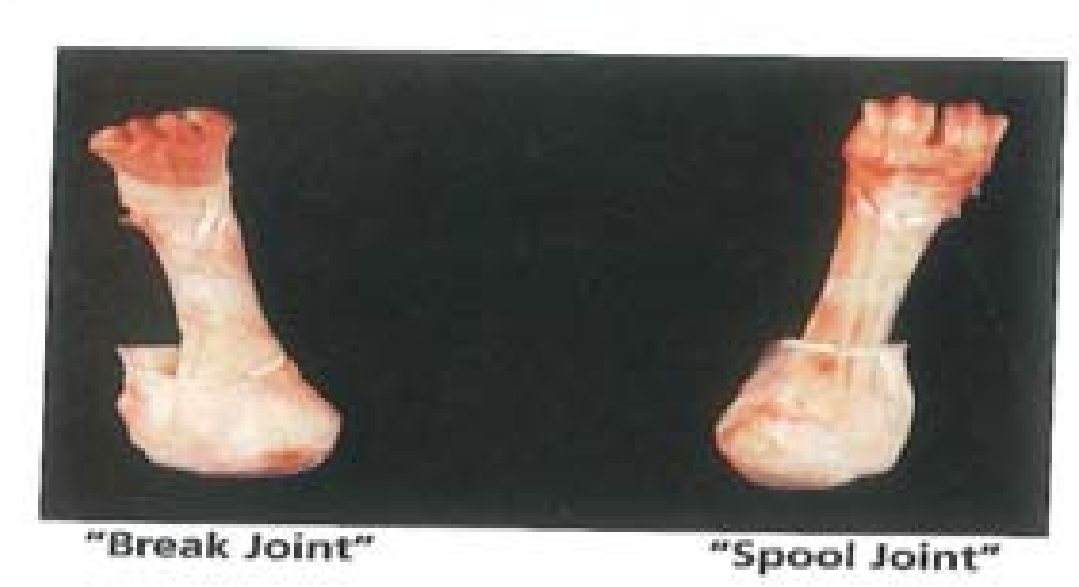
Lamb grading in America

Lamb grading in America is voluntary, although it is often a specified requirement from customers. Grading is done by the United States Department of Agriculture (USDA), this way it is independent. The grade the carcass is given, stays with it until it is in retail packs in stores.

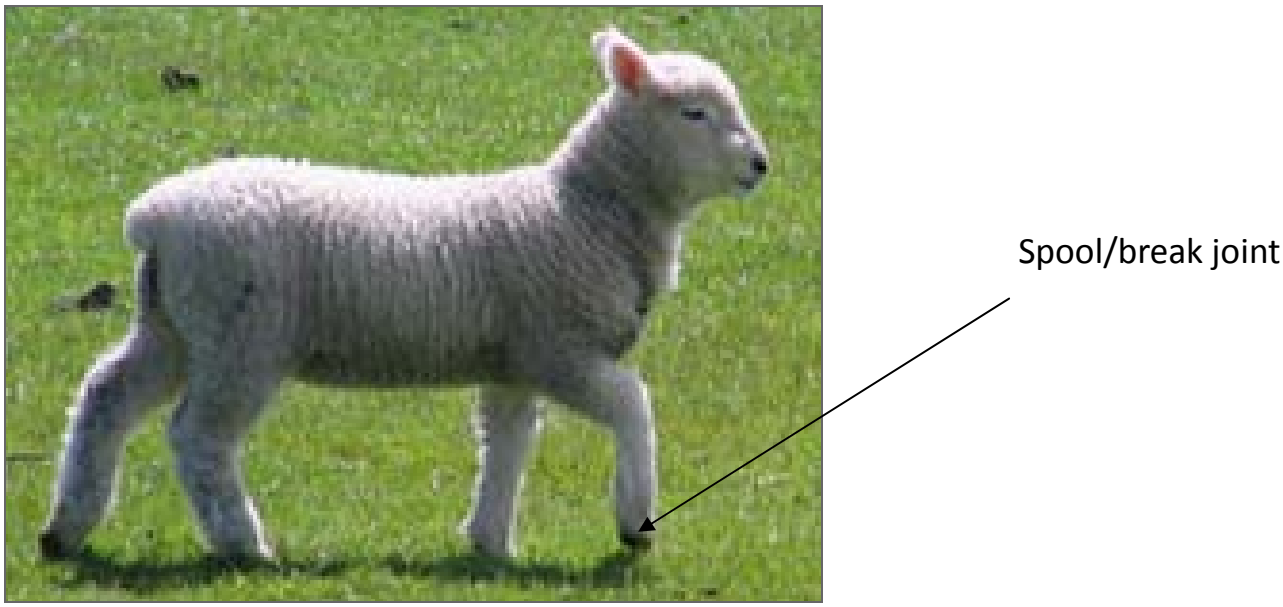
There are three stages of grading in America, the first stage is to determine the class, i.e the age group into which the carcass falls. The explanation is summarised in the table below:

Lamb Carcass (A)	• Break joint on at least one of the front shanks. • Slightly wide and moderately flat rib bones • Light red colour of lean • Fine texture of lean
Yearling Mutton Carcass (B)	• Break or spool joints on front shank • Moderately wide and flat rib bones • Slightly dark red lean • Slightly coarse texture of lean
Mutton Carcass (C)	• Spool joints on front shanks • Wide, flat rib bones • Dark red lean • Coarse texture of lean

- Imperfect or missing shanks are considered as spool joints



The break or spool joint is lowest joint on the lamb , see image below:



At a certain age the break joint calcifies and becomes a spool joint.

Distinction is made between male and female carcasses, but this isn't graded as such. Sex is determined by identifying cod or udder fat. This is important to the grading because if the male carcass has a thick neck and heavy shoulder it may be downgraded, anything between half and 2 whole grades.

Classifying lambs for age

Stage 2: Quality grades

"Visible characteristics that influence customer acceptability and cooked lamb palatability".

Quality is determined by the level of fat streaking in the flank muscle and this relates to the level of maturity too. A minimum degree of streaking is required for each grade.

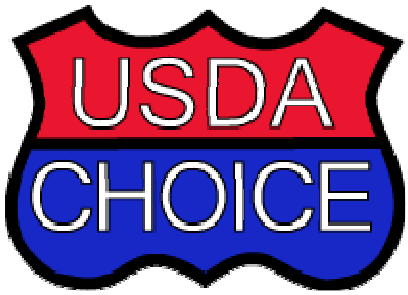
The quality grades are as follows:

Prime:

- Moderately thick muscled throughout
- Wide and thick compared to their length
- Moderately full and plump legs
- Moderately wide and thick backs
- Moderately thick and full shoulders

Good :

- Slightly thin muscled throughout
- Narrow compared to their length
- Thin tapering legs
- Narrow backs and shoulders



Utility: Lower conformation than Good

Prime and Choice grades account for 80% of lamb graded in America. The reason for a photograph of beef here is because no retailers we saw had lamb to sell—an effect of the high prices in America in 2011.

This photograph shows how the grade continues to identify the cut all the way through to the end customer.

There are other components to consider when grading the quality of the carcass. A lamb can be graded unribbed or ribbed. If grading ribbed the marbling in the rib eye, the rib eye muscle colour, texture and firmness are all components to consider.

Marbling in intramuscular fat is positively associated with good flavour and texture in meat.

Marbling = Lean Quality

Flank Streaking = Lean Quality

When grading an unribbed lamb (ribbed or unribbed is determined by the processor and linked to the end customer), the colour and firmness of the lean and fat, along with the flank streaking are evaluated. The flank streaking indicates the level of marbling maturity in the lean.

The colour of the lamb fat should be white and hard, if the fat is yellow and creamy the quality of the lean is lower. The colour of the lean needs to be a bright pinkish red colour, this is what the customer prefers, not a dark red or brown colour.

Lambs are graded cold in America therefore the colour of fat and lean is easy to determine.

Ribbed grading—where the carcass is cut in order to grade

Unribbed grading where the carcass is left complete to grade

Large chiller where lambs are graded

Flank streaking is important when grading for quality. There are 9 levels to describe the amount of streaking, from “abundant” to “practically devoid”, and these are evaluated as an average of the level of the primary and secondary flank streaking.

Each different factor is taken into consideration by the USDA grader when they are assigning a quality grade to the carcass; from the flank streaking, marbling and overall conformation.

USDA grading station at JBS Swift. The station offers matted flooring and a heater overhead for the grader, what luxury!

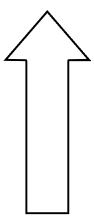
Stage 3: Yield Grading

In comparison to quality grading, yield grading puts a focus on the cutability of the carcass (retail value) and the lean quality. The aim is to identify the cutability, or the expected yield from a combination of the boneless shoulder, bone in rack, bone in loin and semi-boneless leg, all trimmed to 0.10ins of external fat. Yield grading takes into account the amount of external fat the carcass has.

Yield is graded from 1 to 5 with 1 being the best yield, and 5 being the lowest yield. Both of these grades are open ended. Grades 2,3,and 4 must not have more than 1% of its carcass in kidney knob and channel fat. This can be removed for grading to happen.

The level of external fat is calculated by measuring the fat thickness on between the 12th and 13th rib on the animal. This is measured by ruler.

If a carcass has uneven external fat distribution this will be taken into account when allotting a yield grade. The areas checked are the dock, shoulders, flank, cod/udder fat.



External Fat = Retail cut value

Grade 5 yield on this cut, this would not have been graded for quality due to the high level of fat on the carcass. This was being trimmed and sold into the ethnic trade, or going to Mexico.

Yield grade

As explained, the yield is graded 1 to 5, by determining the thickness of fat between the 12th and 13th rib; see below for the fat thickness and which grade it relates to:

Yield Grade	Fat thickness between 12th and 13th rib	% of total retail cuts from the carcass
1	0.00 to 0.15ins	78.4 or greater
2	0.16 to 0.25ins	74.4 to 78.3
3	0.26 to 0.35ins	70.4 to 74.3
4	0.36 to 0.45ins	66.4 to 70.3
5	0.46ins and greater	66.3 or less

Accurate fat thickness evaluation is essential to grade for a yield. This then equates to a percentage of saleable meat within the carcass which relates to the saleability of the product.

All the theory behind the grading system has been explained now, so the next part of the report will give an account of my visit to America, the farms and the factories, the food and the characters I met.

My Experience of America

Theory into practice

Having read the information available on lamb grading it was time to put all the theory into practice. I had contacted companies before travelling to ensure a productive study tour. Superior Farms, USDA and JBS Swift were all happy to meet me to explain more about grading and visit farms, feedlots and factories with me too.

Lamb production has fallen considerably in America, with the main producer states being Texas, California and Colorado, these states traditionally reared sheep for the value of the wool, but when the payments from the government for this stopped, then the focus changed to meat production.

The lamb we saw was at a farmer's market in the Ferry Building at San Francisco, there is an obvious 'foodie' scene in San Francisco with the food carts, steak houses and restaurants (in my element!). The farmers market was the smartest market I have ever seen, and it was in an ideal location to catch the young professionals who came into the city for the work day.

This lamb was sold by the producers and was marketing the fact that it was grass fed lamb. To me the meat looked quite fatty, and you could see that fat had been trimmed from the cuts before it was presented. The producer explained that this type of lamb was born in California and then sent North to Oregon for the grassland where they graze until they finish.

Branding for the shop and the lamb itself

Lamb chops at $10.99/lb

Large leg chops

The next stage of the tour was a train journey from San Francisco to Davis, California. Described by all guide books as a small town, not so in my opinion, the population is approximately 65,000 and it is the University town which meant a huge influx of students during term time. A little larger than Tregaron!

Superior Farms lamb plant is situated at Dixon, CA which is close to Davis. Greg Ahart (National Director of Producer Relations for Superior Farms) was my host here. On the first day Greg drove around the Davis area, explaining about agriculture in CA in general. The soil is very fertile, all flat, a lot of crops growing here, but wouldn't be able to without the irrigation systems set up, it is a very dry state. They grow crops for stock feed, eg alfalfa, wheat straw, oat hay, corn and crops to sell for human consumption such as tomatoes, olives, walnuts, almonds, watermelons, sunflowers (for seeds).

Sunflowers growing, not far from the lamb plant in Dixon, CA

The temperature in Davies is 32 degree centigrade and above, I loved it, such a change to the weather we have had at home, however, it was a drought in California, and they were longing for rain and fires were starting in neighbouring states.

In America, each state has an agricultural university, and California's is in Davis. Greg took us along to meet Dayna at University Campus in Davis, who was in charge of the agriculture department and all the agri students. A selection of stock here, sheep, beef cattle, pigs, donkeys along with a veterinary school. The part that impressed me most was the meat cutting plant where students learn the process of slaughter through to retail packing and selling the product. UC Davis had 4,500 agri students, the majority of which were planning to graduate as vets.

Agriculture student accommodation, with offices and sheep pens

Resident pet sheep at UC Davis

Greg also took us to see his own flock, which he shows and is very successful in this venture. He keeps 100 ewes, they are show stock of Suffolk cross Hampshire downs. The majority of the sheep in California are white faced, these are a Romally, which is an American version of the New Zealand merino, a very woolly breed.

We saw some agricultural buildings, and there wasn't much sign of re-investment in sheep breeding. This was different to the dairy sector as there were new dairies being built.

Superior Farm factory visit:

Superior farms, Dixon is owned by the staff, the firm believe that this is why they have loyal staff members and a low staff turnover. The plant had a very family feel, everybody talking to us and welcoming as we went on or tour.

We worked through clean to dirty so we started in despatch.

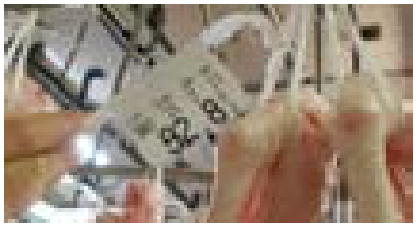
The packaging and labelling looked very good, the lamb cuts looked fresh and a good colour, very desirable.

Australian lamb ready to go to store (no American being retail packed when we visited)

On the kill line, Superior Farms wash the carcasses. This is because they have dusty dry stock, which causes contamination problems. At the end of the line they wash the carcass again, in an acid solution to kill any bacteria.

Grading practice at Dixon was to weigh the carcass, then separate them into weight groups. A United States Department of Agriculture (USDA) grader allocates a predicted grade and yield before they are moved to the chiller. A second USDA grader will work through the chiller once the carcass is chilled, confirming and adjusting grades as required. The carcass is then stamped with its final grade and yield.

Superior Farms does not require any farm assurance scheme, although proof would be required for products sold on regionality.



There were large carcasses in the chiller, one was 92lbs in weight!

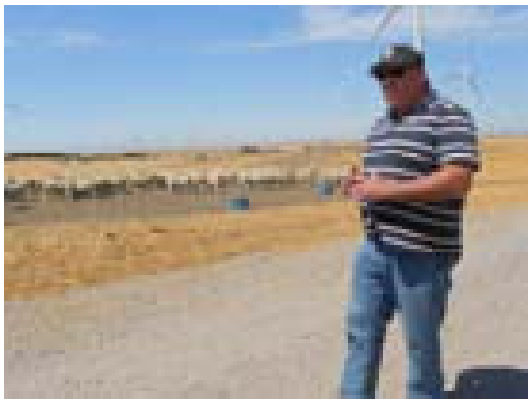
92lbs = 41kg (approx.)

Greg Ahart of Superior Farms

Another part of Superior Farms was a new venture called Pet Provisions, producing pet treats, which were to be launched in chain pet food stores soon. The treats were dried bones, lungs, trachea and pizzle twists from lamb and venison. This is likely to be a very successful venture, with low input costs and with good customers who are willing to spend on their pets.

Farm Visit:

The next day, we met up with Greg and we travelled to meet Richard Hamilton from Hamiltons Ranch down near Rio Vista. Richard keeps 500 breeding ewes, and his focus is to find the right genetics for his land and production system. Richard is a firm believer in finding what works best for you when looking at genetics. Hamiltons sell all suitable stock to Superior Farms, and anything else goes into the ethnic trade.



Part of the land that Richard farms is on Ryer Island (near Sacramento), which is a man made island, sitting lower than sea level. This is very fertile land where sheep are used to graze between grape vines and in orchards.

Facts and Photographs

Lamb price is $1 per lb (stock paid on live weight)—trade is slow due to lack of demand in sales, this means that lambs are being kept on, and getting heavier, causing a bigger problem in the industry. Killing animals up to 250lbs in weight.

Pests for sheep are coyotes, wolves (protected) and mountain lions. The government has a pest control unit but animal welfare is a concern.

Irrigation systems run from dams in the mountains and bore holes, everything is driven by gravity, no pumps are used to get water to farms.

California has its own burger joint—"In n Out" burgers is a brand which use high quality, local produce, and is envied by many other states. I thought it only right to sample this product—it was good!

California describes itself as the 'freak state' - has a reputation for embracing change, being leaders in social change and this would be why there is a strong interest in where their food comes from. While we were in a taxi in San Francisco, the driver quoted to us that "for the first time ever you need to be rich to be thin, it's insane" . Food is fashionable in California.

USDA visits:

JBS Swift, Greeley, Colorado

The first visit we did away from Denver was at JBS Greely, where we met Managing Director Kevin Quam. Kevin took us around the whole factory, where we saw the kill line, skin shed, and through to the packing halls. What was interesting about this factory is that Kevin rents the retail packing rooms to another Rosen Mountain (meat cutting company) so he is responsible for the whole carcasses until the next room buys them from JBS Swift.

Killing 1200 to 1500 lambs a day, this is the biggest lamb kill in the USA. Kevin is a man under pressure with everybody wanting to sell, nobody buying, and last years lambs still about with the new season already starting.

With USDA graders and Kevin Quam at the JBS Swift lamb plant in Greeley.

Beef carcasses cut ready for grading at the beef plant. The camera was used for grading these carcasses.

Grading camera in action in the beef grading

The traditional grading method for beef, before the cameras. Payments are not yet paid from the camera measurements, but still on traditional grading methods. Kevin is keen to get camera grading in for the lamb plant too.

The next visit was the livestock market at Greeley where we met Randy Hammerstrom and Tessa, who work for the Agricultural Marketing Services division of the USDA. Their roles were to report market information on all types of produce from lamb and beef to beans and soya. This visit was just like going to a mart at home, where we all turn round to see who the strangers are!

Feedlots are a way of life in America, large areas of stock yards, animals bought in and fed ready for kill. The sheep feedlot was also near Greeley (well situated for the lamb plant) and owned and run by Mike Harper and his family. Harper Livestock have the capacity to hold 85,000 lambs, a permit to hold 63,000 lambs and current stock of 45,000. Mike was also feeling the pressure of the low prices and feeding stock.

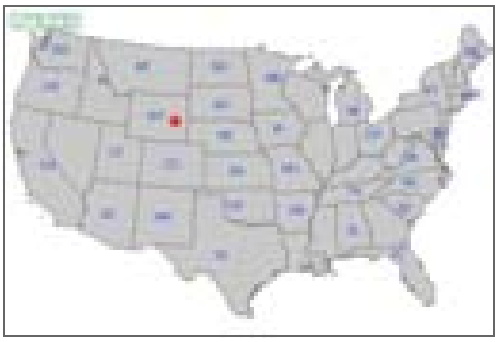
The yards were clean and tidy, and the stock looked very content, they were handled a minimum amount and animal health was dealt with as required, and there were facilities to isolate stock if needed. There were a number of employees at Harper Livestock, one staff member responsible for maintenance only.

Pen card system at Harper Livestock

The cattle feedlot we drove around (ownded by JBS) had 90,000 head of cattle currently being held, with their own feed mill on site, I could never have imagined scale like this. Again the stock looked well and content, they all had access to sprinklers because of the heat. The handling system had been designed by Temple Grandin, which was done in order to improve animal welfare. The staff here used horses to drive the cattle.

The last day of visits arrived, with a nice early start and a long drive up to a town called Douglas in Wyoming. A very rural area. Here we spent time with Brad and his family who own and run Boner Ranch. Boner Ranch has 85,000 acres, and rents an extra 15,000, although this is a very large holding, it is very dry and as such the stocking rates are 1 ewe per 8 acres and 1 cow per 40 acres, The 15,000 acres of rented land is by the river, which makes it very valuable to Brad as he can grow alfalfa here, which he grazes and harvests to feed the stock.

Brad is also a director of Rosen Mountain (the meat company working out of JBS Swift in Greeley). The next big challenge for Rosen Mountain is to get fresh lamb retail packs into Walmart. This is a big challenge as lamb has lost its shelf space following the high prices .



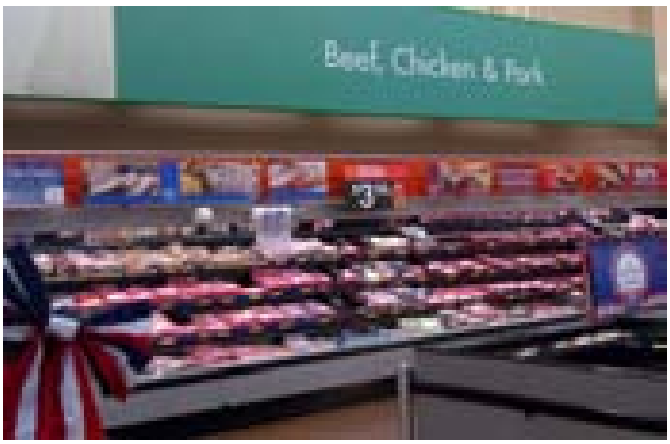
Douglas, Wyoming, USA

With Brad Boner at Boner Ranch

Llama protecting livestock from coyotes

Rare and invaluable oasis
in 85,000 acres of sand

Something that doesn't show in the photographs is the smokey haze which was in the air. This was smoke from the fires in Montana, which is the state north of Wyoming.



Conclusion

Having visited America and France, seeing the farms, factories and speaking to people within the industry, I have tried to evaluate and compare the systems of grading and payment with our own.

Summary of the grading in America:

Yield measurement and a quality grade structure is good as it is all based around quality.

The weakness of the system is that the grading is not executed well enough to do the system justice, I feel that America need cameras in place in order for this to be more effective. As lamb is not selling well at the moment, and it is not as important as beef is to the USA, then it is unlikely that this investment will be made soon.

The payment system also needs to be brought back in line, as all carcasses are sold as choice, rather than prime, good and utility and as a result there is no incentive for anybody to produce any better.

The payment sheets I saw base payment on yield, with percentage of retail cuts noted on the sheet.

Summary of VIA cameras in France:

The VIA camera in France, was not accurate enough to base payments on it as yet, but there was the drive from suppliers and processors to push the system forwards to change to camera measurements, but the feeling was that the government need to push for it to be developed further. Payment suggested was yield per top (shoulders) middle (Loin) and bottom (haunches) but this was not in place as yet, therefore no payment sheets were available to compare with the American system.

What next for Wales?

I believe Wales needs a bespoke grading system. We have a large amount of expertise in the sheep industry, and I feel we could develop a grading payment programme to suit us specifically. I like the simplicity of the good, choice and prime quality grades in America, as it runs through from supplier to end consumer. I believe however, that the system we develop should also reward farmers, for example, for a farmer who has invested in EID and wants return information, the system should provide the highest level of relevant information possible, as they are the first part of the supply chain.

With the first part of the chain able to act on information received at grading, this stage should become more efficient. This is also the case for the processor, the processor could be more efficient if the correct type of carcass came in for each different customer. This way the end customer will get the most efficient product and the best possible price. All things considered, we must always remember that the customer is buying the product, and the aim is to provide the best product, at an affordable level.

Regards measurement methods, the camera seems to be the basis of the way things are going, but much work needs to be done in developing the technology. My concern is that the fat level is not yet accurately read. Is there a possibility to develop a probe which could accurately assess the ratio between , meat and bone in a carcass? If so, I believe this would be an effective step forwards.

A few photographs

Wool is graded and paid for according to a chart such as this. Randy Hammerstrom (AMS) is qualified to grade wool.

Judas sheep, kept in the lairage to lead lambs to the working end of the lairage

Pups in the lairage, it is common practice here to have dogs in the lairage yards, this one had had a litter.

Typical example of American sheep housing

A few photographs

With Randy Hammerstrom (A real life cowboy!) Mike Harper of Harper Livestock, supplier to JBS Swift, Greeley

Chris and I with Willard Goad of USDA, Denver. Willard looked after us for most of the second week, and have since retired (I hope we didn't bring this on!!). I would like to wish Willard all the best now he has left the USDA, I am sure they will miss him greatly.

With Richard Hamilton, Hamilton Ranch, a supplier to Superior Farms, Davis, CA

Uncle Dayna, who looks after all agri students, including Greg Ahart who studied here.

With Brand Boner, Boner Ranch, supplier to JBS Swift, Greeley. Also a director for Rosen Mountain. As you can tell, I never met anybody quite so tall!

Thank you

This has been a once in a life time experience, and so many people from different areas have helped and supported me. From the application for the scholarship, to the visits, to the follow up, without this support this report would not be possible.

There are many thanks I would like to give, so here we go:

Hybu Cig Cymru	for giving me this opportunity and in particular, for the moral support and understanding from Lynfa Davies
Dunbia	Paul Edwards
	Jonathon Birnie
	Michael Dundon
ETS Destrel	Herve and Phillipe Destrel and their families
USDA	David Szabo
	Willard Goad
	Randy Hammerstrom
	Tessa
Superior Farms	Greg Ahart
	Gary Pfeiffer
JBS Swift	Kevin Quam
Ranchers	Richard Hamilton
	Brad Boner
	Mike Harper
Wales:	Chris Harvey
	Huw Davies