7. The Imports

Figure 1. Texan hogget does awaiting shearing at Kirra Station c1990

The Texan Importation

Australia had been free of many of the serious diseases of livestock for over 50 years due to a complete ban on imports and this policy was overseen by **AQIS** (the Australian Quarantine and Inspection Service). Clearly the embargo on livestock imports inhibited the availability of breeds and genetic gains which had been made elsewhere. However, there was a strong belief that science could deliver access safely. Undoubtedly, there was also a concern that technology could facilitate clandestine imports via semen and eggs and that such events might be forestalled by allowing controlled imports. The government policy was outlined by the 1982 letter from K A Doyle (see below).

In the case of Angora goats, the high interest and the clear disparity in quality between the local animals and the Angoras of Texas and South Africa made Angoras a prime target for importations. There was also interest in importing some sheep breeds and poultry genetics were a huge issue, with the ease of egg smuggling being of great concern.

It is clear from this letter to the **Angora Breed Society** that policy was changing quite rapidly paving the way to allow the importation of live Angoras from Texas. No semen was allowed, and since each applicant would be treated separately, there was a need to think through the issue of multiple importers. In any event it all happened, and importers were allowed to see their animals at the end of in 1984.

Permission given.

DEPARTMENT OF HEALTH

CANBERRA, A.C.T.

TELEPHONE: 89 1555
TELEGRAMS: 'HEALTH, CANBERRA'
TELEX: AA62149

P.O. BOX 100
WODEN, A.C.T. 2606

COMMONWEALTH OF AUSTRALIA

IN REPLY PLEASE QUOTE 82/1945
82/1946
KAD:AL
Q.D.

PRESIDENT
ANGORA BREED SOCIETY OF AUST
P.O. BOX 31
CUDAL N.S.W. 2864

22 JUL 1982

THE LATEST ON IMPORTATION – 4 Items
FROM THE Ass/Direct General.

Dear Sir,

We receive many enquiries regarding the importation of Angora goats from the U.S.A.. We appreciate that there is a strong demand for such animals and we understand the reasons for this demand, including the availability of high quality breeding stock in the U.S.A., the need for improved genetic material for Australia, and the difference in fleece weights between animals in the two countries.

This office has been working on the development of conditions for the importation of genetic material from goats for some considerable time. Those familiar with the diseases of sheep and goats will be aware that the slow virus diseases including scrapie and maedi-visna create considerable difficulty in the development of such conditions. We have hoped for some time that the epidemiology of these diseases in the goat (as compared with the sheep) would make it possible for imports of goats to be made long before it would be possible to import sheep (which we see as a long way off).

As a means of fully investigating diseases which are present in goats in the U.S.A., including their distribution, epidemiology, and significance in the local industry; a number of veterinary officers from this office have visited North America for discussions with our American and Canadian counterparts, and for on site investigation of the situation there.

In the development of conditions of testing, transport and quarantine for imports of all species, this Department routinely consults the veterinary authorities of all States and the Northern Territory, the Bureau of Animal Health, the Animal Health Division of CSIRO, and the Australian National Animal Health Laboratory. Other experts in Australia and overseas are consulted as appropriate. By this means the best available expert advice is utilised and all procedures developed undergo the most intensive peer review.

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Once draft conditions have been developed they are then discussed extensively with the authorities of the exporting country to ensure that the legal mechanisms, veterinary manpower, laboratory testing systems, certification and supervision procedures etc demanded can be met. Such arrangements may vary according to the industry structure, legal arrangements and veterinary services of the country of origin.

So far as goats from North America are concerned we are still at the stage of consultation with veterinary authorities throughout Australia.

Because of the presence of insect-borne virus diseases such as exotic strains of bluetongue in the U.S.A., it would be a strict requirement that the animals could leave North America only during the winter months, (i.e. November-April) when the insect vectors of such diseases were inactive. Furthermore we would envisage that the animals would depart only from the northern part of the U.S.A., at least as far north as the 40th parallel and excluding the western maritime states. This is presently the practice with imports of cattle.

It is likely on evidence to hand that a high proportion of animals would fail the types of tests we would require to be made before departure from North America. Further, the nature of the slow virus diseases will probably necessitate an extremely long pre-embarkation quarantine period in North America prior to departure of the animals for Cocos Island. Similarly it may be necessary for them to undergo a long term quarantine on Cocos Island itself. Full details of these quarantine periods are still under discussion.

Because the duration of the quarantine periods have not been determined at this time, any costs cited by officers from this office either informally or formally have been based only on extrapolations of costs associated with the testing of the various consignments of cattle which have come to Cocos Island. They have been given only as a guide to those who have requested such information to assist in long range planning. It should be noted also that all consignments coming through the Cocos Island station are on an "all-in all-out" basis.

Though we have seen suggestions to the contrary we would envisage imports of goats being carried out on a normal vendor to buyer basis, with appropriate communication through agents, as has been the case with the other species. Because long quarantine periods may be necessary which could result in high costs of importation it could well be that syndications or other forms of joint ventures could prove to be appropriate or even necessary. Such arrangements would largely be in the hands of industry itself.

Access to the Cocos Island Animal Quarantine Station

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is granted by the Minister on the basis of recommendations from the Advisory Committee on Animal Import Priorities. As all three consignments to date have been of cattle, the question of priority among species has not yet arisen. It would however be considered by the Committee when health conditions for imports of goats are finalised and when applications have been received.

As has been the case with other species this office would envisage that once health conditions have been finalised advertisements in the press calling for applications would be made. These would be reinforced with letters to breed societies and those who have previously expressed interest to this office. Space in the station is normally allocated to individual owners on the basis of their individual applications. While each consignment is a complete entity each applicant must apply individually and be allocated space by the Advisory Committee on Animal Import Priorities. There is no question of the station being allocated to any particular agent or industry at this time.

We understand that some people believe that this Department has an office in Texas to coordinate arrangements. This is not so, our communication with the Americans is through the Australian Embassy, Washington.

It should also be noted that goat semen may not be imported from North America at this time and no change is expected to that situation until the question of the slow virus diseases has been clarified (at the very earliest).

When asked by interested parties we have endeavoured to explain the present situation regarding the development of conditions for importation without creating undue expectancy that imports would be available in the short-term. We consider it extremely important that we do not give industry deadlines which we are unable to meet as this could result in expense in travel and selection of animals which may not be able to come to Australia.

Yours sincerely,

(W.A. Doyle)
Assistant Director-General
(Animal Quarantine)

Figure 4. AQIS Policy statement to Angora Breed Society

AQIS worked hard to develop protocols and moved to allow the importation of goats and sheep from the US. In 1984, a consignment of 74 live Angoras, two Suffolk rams and a Ramboulet ram arrived. The animals (and their properties of origin) were tested and the animals flown to Chicago in the winter (at -30 degrees) so there were no insect vectors for **Blue Tongue**. The animals then went to Cocos Island (tropical summer) and then to **Torrens Island** in Port Adelaide (temperate summer). During the extended trip a kid was born – OOPS! The animals were not supposed to be pregnant!

The importers acted independently and privately with AQIS simply provided the mechanism for movements and formalising the rules for final release. Since the animals were run together, the rule was that **all** the animals had to pass all the tests before any material was released. None of the actual imports were to be released though semen and embryos could be released once the consignment was cleared. The rule to clear the consignment from **Scrapie** was that each imported animal had to produce 5 progeny, at an age of 5 years without any signs of the disease before any material could be released. Obviously, there was a level of breeding both within the consignment (and with the 6 Australian does allowed for each import) while in quarantine.

Figure 2. Importer syndicates visit Torrens Island to see their animals

Seventeen syndicates took up the offer to bring Angoras from Texas. It became evident that Torrens Island was just was not appropriate as a long-term quarantine facility with a significant breeding programs, and a hunt was mounted for a suitable property. Peter Cook and Bob Lot found **Kirra Station** in the middle of what is now the Ngarat Conservation Park between Keith and Pinnaroo in South Australia. Peter did a huge job double fencing the property, funding developments and running the station for the importing syndicates. AQIS ruled that the consignments could not be broken up, so all animals would have to go to the Station once it was certified. Once again, the Angora industry demonstrated its

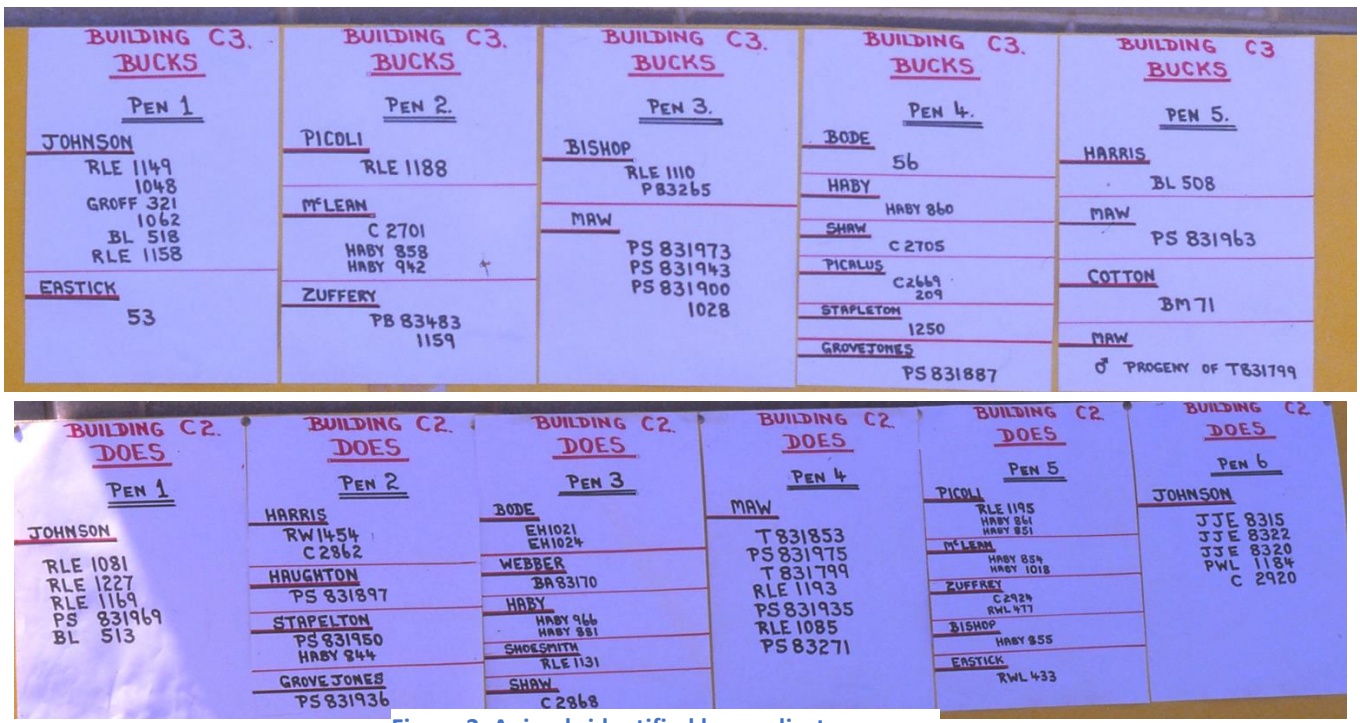


Figure 3. Animals identified by syndicate

Figure 5. Surprisingly mature bucks (born March 1983) with horn tip tags. Hard to know what people thought. We did not know what to expect or how to behave at the Torrens Island Quarantine Station.

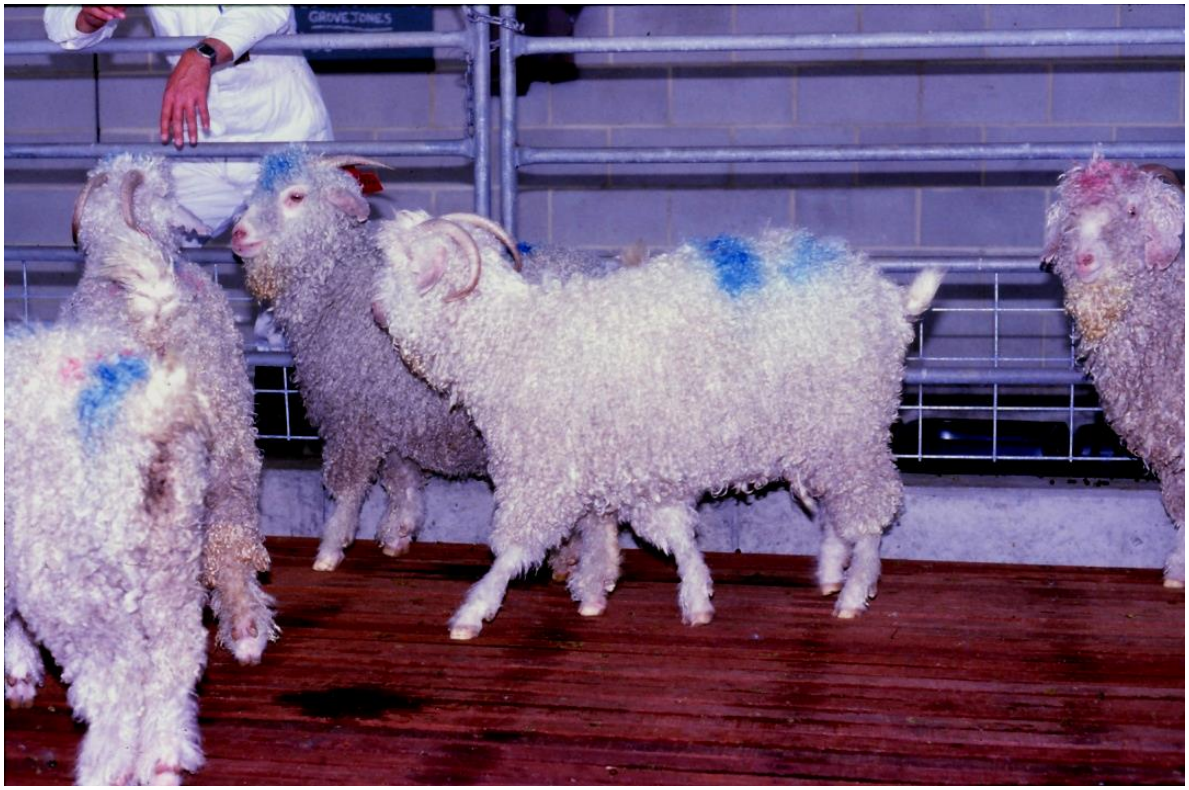


Figure 6. Spray mark a bit of an issue on the does. Note the animals had come from Chicago in winter via Cocos Island in tropical summer to Torrens Island in temperate summer

inability to agree and 2 importers took AQIS to the Administrative Affairs Tribunal and won, giving them the right to set up a second station just over the border in Victoria.

So began a difficult and expensive 7-year period of quarantine. The staff were used to cattle imports but were unfamiliar with fleece producing goats. One issue not readily understood by the importers was the reverse seasons in the **Southern Hemisphere**. This added further to the confusion the animals experienced in terms of reproductive and fleece growth cycles. The extended period of dry feeding on slatted floors following the major shifts in climate added to stresses but eventually the animals were allowed to graze the limited area of pasture. Losses did occur and eventually AQIS accepted the need to move the animals to more appropriate facilities.

It is hard to comprehend the scale of this exercise. No sheep or goats had been imported into Australia since the 1920's. Gaining permission for this exercise was a major breakthrough and the Australian government and its agencies showed considerable foresight in allowing this (and several other) importations. The policy of allowing importations was based on the concept that, if such actions were technically feasible, they should be allowed. There is little doubt that the genetic value of the Texan Angoras was far superior to the then Australian flock (this will be discussed later) and it remained to be determined just how successful the Mohair industry would become with importations of superior animals.

AQIS had the difficult task of dealing with 17 syndicates of importers and providing sufficient staff and facilities to make the long-term quarantine required practically possible. There were also 2 sheep syndicates with their own requirements. It also needs to be remembered that the Angora industry was somewhat notoriously fractious though there was the overriding desire to get hold of the animals so people were generally keen to cooperate. However, the financial requirements were stretched with the world crash in mohair demand. There was little doubt that some syndicates found it very difficult to meeting the costs of quarantine.

Figure 7. Summer at Kirra Station c1989

Imported Texan Animals That Have Contributed to The Gene Pool

~~Listed to Show Common Sires~~

	IMPORTED ANIMAL	SEX	SIRE	DAM
1199	Pember & Son TX442381-1237	F	Brooks Sweeten TX425901-9309	Pember & Son TX417490-442
1202	Pember & Son TX454619-1969	F	Pember & Son TX431676-1040	Pember & Son TX422801-634
1203	C H Chaney TX454572-2920	F	C H Chaney TX425794-1637	C H Chaney TX430790-1836
1204	R L Ebling TX454745-1169	F	Ebeling TX429876-603	R Ebeling TX434734-773
1205	J Esquell TX453837-20	F	B Lockhart TX431271-162	R Ebeling TX436919-66
1206	R Ebeling TX454784-1227?	F	Ebeling TX444035-492	R Ebeling TX445378-475
1209	R Ebeling TX454809-1081	F	Ebeling TX445350-610	R Ebeling TX445350-527
1224	R L Ebeling TX454751-1193	F	Ebeling TX429876-603	Ebeling TX434743-850
1227	R Ebeling TX454752-1195	F	Ebeling TX429876-603	R Ebeling TX445378-760
1228	Pember & Son TX454620-1975	F	Pember & Son TX447764-1638	Pember & Son TX424928-744
1231	F W Lux TX451819-1184	F	G & L Schmidt TX441951-1580	F Lux TX448872-896
1232	Frank Powers TX454453-1853	F	Roland Trees TX500126-1176	F Powers TX442024-697
1234	Chaney TX454568-2862	F	G & I Schmidt TX439401-1570	C Chaney TX435613-2022
1235	Ebling TX454817-1131	F	Ebeling TX445350-610	R Ebling TX442136-244
1237	A Brice TX453572-170	F	Roland Trees TX439487-640	H Oehler TX434899-3144
1238	Pember & Son TX??????-1936	F	Pember & Son TX447764-1638	Pember & Son TX442392-1268
1239	Pember & Son TX454610-1935	F	Pember & Son TX431676-1040	Pember & Son TX434446-995
1240	Pember & Son TX454617-1950	F	Pember & Son TX447764-1638	Pember & Son TX434441-983
1241	C H Chaney TX454573-2942	F	C Chaney TX425794-1637	C Chaney TX430804-1876
1242	E Hipsher TX454536-1024	F	C Chaney TX444255-2173	E Hipsher TX440157-606
1243		F		
1246	Roger W Lux TX451801-454	F	R Lux TX447307-343	R Lux TX449024-287
1247	Esquell TX453834-15	F	Lockhart TX431271-162	Lockhart TX432713-466
1251	Haby TX454074-1018	F	Fritz Kuebel TX500244-K493	Haby TX432073-926
1252	H Haby TX453997-844	F	F Earwood Est TX441410-5554	H Haby TX435323-1206
1253	Haby TX454038-966	F	Ebeling TX447468-566	Haby TX448929-169
1256	W H Lux TX451796-433	F	R Lux TX447307-343	R Lux TX427368-141
1260	H Haby TX454004-861	F	F Earwood Est TX441410-5554	H Haby TX438717-1480
1262	Bill McInnis Tx501951-56	M	G & I Schmidt TX439398-1564	W H Lux TX440144-891
1264	Ebeling TX503726-1062	M	Ebeling TX444035-492	Ebeling TX436928-122
1266	R Ebeling TX503721-1028	M	Ebeling TX444035-492	R Ebeling TX442139-192
1269	C H Chaney TX503534-2669	M	G & I Schmidt TX437163-1412	C H Chaney TX446863-2378
1270	A Brice TX503096-209	M	Roland Trees TX439487-640	Pember & Son TX442381-1237
1271	Bill Mc Innis TX501949-53	M	G & I Schmidt TX439398-1564	R Lux TX438652-226
1272	Haby Tx503865-858	M	F Earwood Est TX441410-5554	I Jordan 438742-1498
1273	Pery Bushong TX502985-483	M	Ebeling TX437042-14	Jane Bushong TX427172-72
1274	H Haby TX503866-860	M	F Earwood Est TX441410-5554	H Haby TX435349-1278
1276	R Ebeling TX503710-1188	M	Ebeling TX429876-603	R Ebeling TX436898-15
1279	Pember & Son TX503556-1900	M	Pember & Son TX441857-1455	Pember & Son TX424945-752
1280	Pember & Son	M		
1282	Pember & Son TX503585-1973	M	Raymond Pape TX441314	Pember & Son TX448983-1612
1283	Forrest W Lux TX441951-1159	M	G & L Schmidt TX441951-1580	Forrest W Lux TX416211-727
1284	Jesse Lockhart TX503452-508	M	B Sweeten TX447987	B Lockhart TX442466-317
1285	Groff TX501554-321	M	Tx 444996-6263	TX448487-607
1286	Haby TX503871-942	M	H Haby TX447622-584	F Earwood TX449554-6841
1287	Ebeling 1110	M	Ebeling TX444035-492	Ebeling 298
1288	Chaney TX503537-2705	M	G & L Schmidt TX439401-1570	C H Chaney TX430819-1906
1290	Pember & Son TX503552-1887	M	Roland Trees TX444651-1144	Pember & Son TX448986-1617
1291	Roland Trees TX454450-1799	M	Roland Trees TX500126-1176	Roland Trees TX442758-753
11200	R L Ebling TX503691-1158	M	Ebeling TX439701-245	R L Ebeling TX436925-91
11201	B J Lockhart TX503453-518	M	Roland Trees TX439487-640	R Ebeling TX436919-66

DAM OF IM BRICE

Figure 8. The list of imports with their TI identity and breeding

Figure 9. Hogget does awaiting shearing Spring 1990 at Kirra Station. Note use of tents for kidding

Figure 10. Hogget bucks await shearing at Kirra Station Spring 1990

Figure 11. Shorn hogget bucks

Figure 12. Kids drafted off while mothers are shorn. Their Maremma keeps guard.

Figure 13. Shearing 500 mature bucks presented a rather unique challenge

Figure 14. Bold Front on mature bucks made shearing more difficult with sand and grease in the fleece

Figure 15. Kirra had a three-stand shed and it worked for 3 weeks

The importation allowed a huge application of **artificial breeding** technology. **Embryo transfer**, **semen collection** and **artificial insemination** as well as the rather optimistic **embryo splitting** were all involved, even on Torrens Island, but more so when the flock was moved to the two mainland stations. Most importers wanted to maximise their holdings and protect themselves from losses which were not uncommon. AQIS tried very hard to give each team and each syndicate what they wanted by way of access and laboratory space. Of course, there was a huge security issue and the AQIS Veterinarian in charge of the station had a full-time job maintaining a high standard of quarantine conditions.

This situation uniquely coincided with **invitro fertilization** developments in human medicine. The human teams treated humans all week and goats at weekends (so to speak). No doubt the equipment and reagents coincided and, as well, the embryo handlers and vets gained a huge amount of knowledge and skill from the exercises. Technicians spent a good deal of each breeding season collecting semen and embryos as well as doing transfers.

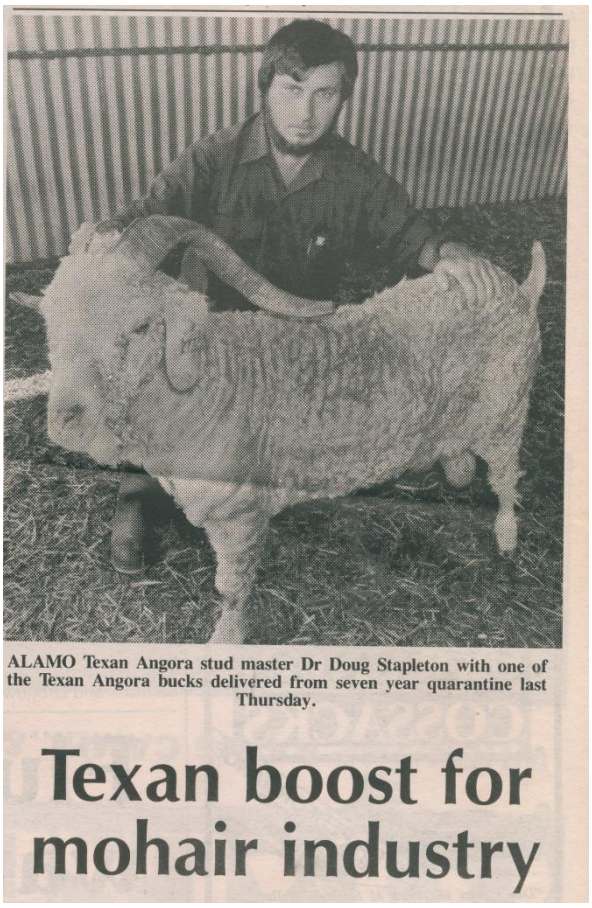
Animals were given a "TI" number – it was unclear if that meant Torrens Island or Texan Import? More than 3000 animals were finally released in 1992 making the Kirra flock the largest in the country. Record keeping was a huge job along with identifying live animal and semen ownership as well as accounting for missing and dead animals. It should be remembered that euthanizing crossbreds was not permitted because all animals were needed for testing and clearance of disease before any animal were released.

As chief classer for AMBA Mohair Pooling operation I was allowed entry to class the clip in 1989 and 1990. While we did **weigh** and record the **class** for each fleece, this information was confidential and only went to the respective syndicates. Even this was too much for some syndicates and in the final two shearings my position was taken by Trevor May from NSW Agriculture, who was eventually able to get a publication from the department's efforts.

Eventually, the release was authorised and then began the transport of animals to all parts of the country. Simply finding all animals for each of the staged deliveries was undoubtedly a nightmare. Noting that the released was set for February 1992, breeders wanted to get animals home for the autumn mating. In our own case at Cudal we had built doe numbers to around 1000 animals and used AI to join some 200 does and the remaining does were mated naturally to Texan bucks. We also did an ET program to expand the numbers of pure Texan animals. This was something of a race to "upgrade" to the much more productive Texan strain.

Figure 16. Finally, after 8 years I got to collect the progeny of the 1983 drop of Texan Angoras. Three hundred odd animals off to Cudal

Figure 17. Arrival at Cudal at 3am.



ALAMO Texan Angora stud master Dr Doug Stapleton with one of the Texan Angora bucks delivered from seven year quarantine last Thursday.

Texan boost for mohair industry

Figure 18. It really was an historic effort and we made the most of it

As suggested in the newspaper article below, the release of the Texan animals marked a revolution in the Australia industry. It is hard to contemplate just how different the Texan animals were. Of course, there was variation, but the Texan mohair fleeces were characterised by heavy grease and low kemp levels. Many were rather coarse, and some had flat locks, especially on the neck and breech. Many of the animals were rather slab sided. However, the fleece weights were huge, not only because of the grease, but fibre diameters were mostly on the stronger side of what was expected in the Australian animals.

To demonstrate the details of the effect of the importation the following observations are presented resulting from observations on the Cudal breeding program. One coincidence should be noted: The release of the imported animals coincided with the development of **drench resistance** (to white drenches) and much concern was expressed about the growth rates and apparent poor condition in some animals. Selenium and Cobalt deficiencies were thought to be present even if these elements were not seen as a problem in sheep.

The graphs and table below set out the observed fleece characteristics of some 3883 fleeces shorn and classed from 4 drops at Cudal and covering as much as 8 years beginning the year before the release of the Texan animals. While there is some variation due to the individual sires used, the spectacular trends in the backcrossing program can be seen. Fleece weights nearly doubled and kempy fleeces virtually disappeared.

Texan boost for mohair industry

THE AUSTRALIAN Mohair industry will receive a boost from the recent importation of 4,000 Texan Angora goats - 300 of which arrived at Cudal last week.

Alamo Texan Angora Stud at Cudal, owned by Max and Hazel Stapleton, took delivery of their goats on Thursday - part of the biggest animal importation ever to Australia.

It is all part of an eight year, $8 million program to improve the quality and quantity of Australian mohair.

Mr Stapleton said the Texan Angoras would artificially inseminate his Australian angora goats.

"We run 1000 breeding does and we should have them all in kid this season," Mr Stapleton said.

"We will be using insemination to switch the Australian animals to at least 50 per cent Texan."

Mr Stapleton explained this would double the animal's mohair yield making it twice as economical and bring the quality of the mohair up to international standard.

"Previously only five per cent of Australian clip of mohair has been at international standard," Mr Stapleton said.

"We've had to market poor quality mohair in the past... it's about time we got into the international scene."

Mr Stapleton said it had been his vision for 20 years to have the Texan Angoras on his stud.

"Mohair is basically a complete export industry," Mr Stapleton said.

"Being at least 50 per cent Texan, the mohair will be easier to market and fetch better prices."

The animals have had a long trip to Australia having been in quarantine for seven years.

Firstly they were quarantined in Texas, then Chicago, then flown to the Cocos Islands, then to Torrens Island and finally to Kirra Quarantine Station in South Australia.

When they were first quarantined they numbered only 80 but in seven years have bred to about 4000.

Mr Stapleton said Australia had gone as far as it could to improving its mohair.

"These Texan Angoras mean we can start all over again now," Mr Stapleton said.

"It finally puts Australia in the international scene."

In two or three years Mr Stapleton said they would also import South African angoras which were presently unavailable.

These animals will also enable further improvement of Australian mohair.

Figure 19. News-paper article of the time

The origins of the Cudal imports involved considerable efforts to sample the available material while in quarantine. Sires for the 1992 and 1993 drops trace to **Brice, Pember, Haby, and Groff**.

Some care is needed in interpreting the effects of the Texan introductions since **fibre diameters** were estimated from classed **fineness** (FK, K, YG, FH, H) and washing yields were estimated from classed "**condition**" (Light, Medium-Light, Medium, Medium to Heavy and Heavy) based largely on soil colour (white to almost red/black). The classing was calibrated from tested samples and test results on fleece at the National Mohair Pool. Measurement of kemp has been shown to be vary greatly and does not seem to reflect visual kempiness which may still be the best way to assess this character.

It is of interest that greasiness of fleeces has never been obvious in the market. Testing **washing yield** has not been accepted to any degree by buyers, unlike in the wool market where trading is on a clean basis. Buyers explained that they knew Texan mohair was very greasy and they adjusted their prices accordingly giving all mohair the same yield when it came to sales. Indeed, separating fleeces of visually different yields (and differences relating these to measured scoured yields stated in the NMP sale catalogue) did not result in a discount for heavier grease. It was argued that the Texan style fleece had much less kemp and this countered the discount which might be offered.

The amount of **grease** in some fleeces was astounding. Second and third shearings at 12 and 18 months of age seemed to have the most grease and there were some exceptionally greasy animals. Washing yields of less than 50% were found. Such fleeces were beautiful to handle when freshly shorn and still warm, but they then set hard and even developed a rancid odour. Animals producing such greasiness were often small, leading to claims that these animals sacrificed growth for grease production. Selection for such high grease production seemed also to lead to problems in the skin. These animals often bled from the skin following shearing thus demonstrating some abnormality in **sebaceous gland** and follicle structure.

Greasiness was not appreciated by Australian breeders and there was a rather rapid drop in grease content as breeders preferred lighter-conditioned animals and for their mohair. This was further changed with the later introduction of higher yielding South African Angoras which overtook national breeding objectives.

In any event the **clean fleece weights** can be calculated and the graph below displays the huge increase in fleece production achieved by back crossing to the Texan strain. Such crosses soon replaced the Australian animals in the national flock. Of interest is the marked **seasonal effect** on fleece weight exhibited by the higher crosses and the pure Texan animals at older ages.

The second graph shows the vast reduction in the proportion of **kempy fleeces**. Of interest is the apparent anomaly in the Australian strain at the third shearing. If this observation was repeated in the national flock it might well explain why stud breeders preferred to offer animals for sale at this age. More interestingly there is a stepwise reduction in the proportion of kempy fleeces. There is still an increase in kempyness in crossbreds after the 6th shearing while there appears to be no kempyness in pure Texans at an older age.

The more detailed Table 1. presents observations on **Greasy Fleece Weight** as well as visually assessed **Fibre Diameter**, **Yield** and **Proportion of Kempy fleeces** over the first 8 shearings (starting with the 1991 drop (Australian) does and following the crosses with the Texan purebreds over the next 3 drops). It is a pity that measurements were not carried out, but it should be remembered that at the time such testing was rather expensive. However, the author had considerable experience with measurements and the assessment of fleeces in while classing during the pooling process.

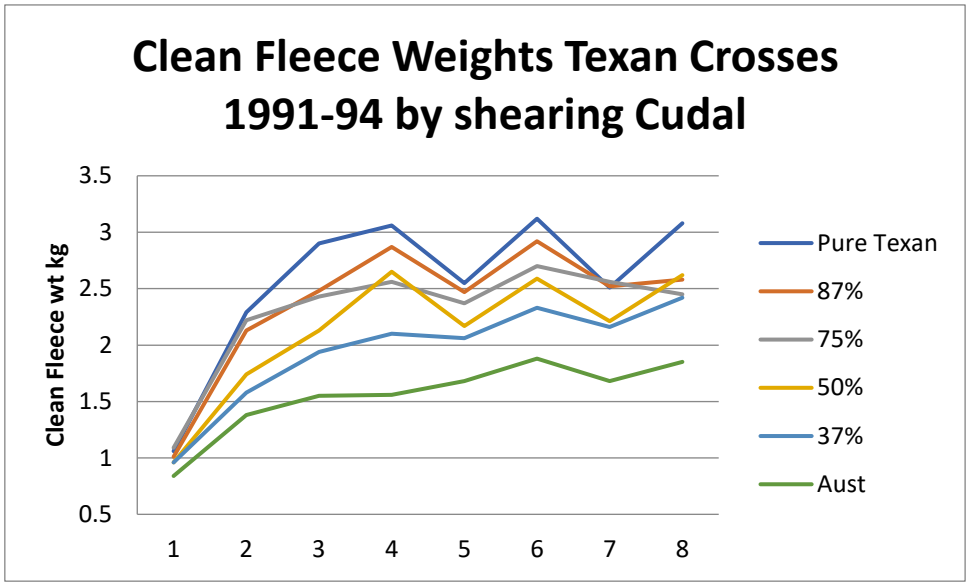


Figure 20. Clean fleece weights by cross over 8 shearings. Note the stepwise progression from the very light Australian strain to the heavier Texan strain

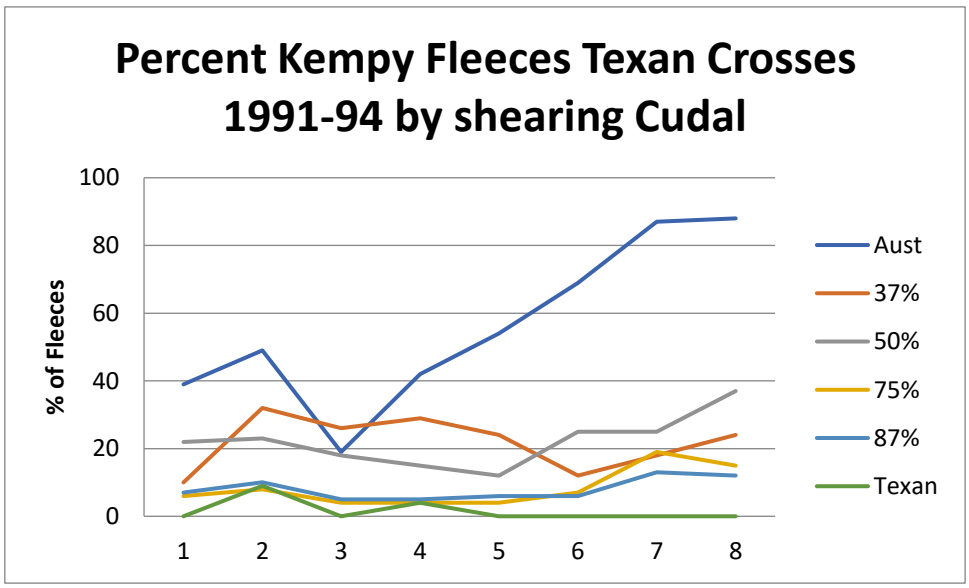


Figure 21. Proportion of Kempy fleeces by cross and age. There is a huge age effect in the Australian strain and the assessment showed dramatic progress with even the early crosses. Note that the Texan purebreds showed no kemp at older ages though crosses retained an age effect.

Table 1. Corrected fleece weights (6 months), estimated fibre diameters and washing yields, and percentage of fleeces classed as "kempy" from 1991 (Australian strain) to 1992/94 following back crossing.

Shearing	1	2	3	4	5	6	7	8
1991 drop. Australian does								
n	114	114	113	113	90	54	7	3
G Flwt kg	0.93	1.53	1.72	1.73	1.87	2.09	1.84	2.06
Diam um	25.73	27.42	30.74	32.06	32.44	33.85	34.29	33.33
Yield %	90	90	90	90	90	90	90	90
% kempy fls	39	49	19	42	54	69	87	88
1992-94 drop 37.5 percent Texan								
n	39	38	38	38	17	17	17	17
G Flwt kg	1.11	1.86	2.26	2.42	2.43	2.73	2.53	2.80
Diam um	24.87	28.74	31.21	33.16	32.82	33.53	33.77	34.00
Yield %	86.5	84.8	85.8	86.6	84.8	85.4	85.4	86.5
% kempy fls	10	32	26	29	24	12	18	24
1992-93 drop 50 percent Texan								
n	356	356	354	348	206	156	130	43
G Flwt kg	1.10	2.06	2.50	3.11	2.55	3.02	2.58	3.06
Diam um	24.57	28.26	30.79	32.19	32.42	32.66	33.22	33.26
Yield %	87.00	84.6	85.2	85.2	85.12	85.6	85.7	85.4
% kempy fls	22	23	18	15	12	25	25	37
1992-94 drop 75percent Texan								
n	99	99	99	99	77	71	67	60
G Flwt kg	1.29	2.69	2.89	3.06	2.83	3.23	3.05	2.89
Diam um	24.48	27.72	30.62	30.92	32.08	32.79	33.34	33.50
Yield %	84.8	82.7	83.9	83.6	83.9	83.7	84.0	84.7
% kempy fls	6	8	4	4	4	7	19	15

1992-94 87.5 percent Texan								
n	41	41	41	41	33	33	30	25
G Flwt kg	1.20	2.65	3.00	3.54	2.97	3.54	3.02	3.08
Diam um	24.29	27.29	29.80	30.78	31.09	32.24	33.67	32.64
Yield %	84.2	80.4	82.7	81.1	83.2	82.6	83.5	83.6
% kempy fls	7	10	5	5	6	6	13	12
1992 – 94 pure Texan								
n	23	23	23	23	17	16	11	10
G Flwt kg	1.29	2.85	3.54	3.77	3.12	3.82	3.00	3.71
Diam um	24.26	27.13	29.96	30.13	31.24	32.25	33.81	34.0
Yield %	82.0	80.2	82.0	81.1	81.8	81.8	83.5	83.1
% kempy fls	0	9	0	4	0	0	0	0