

## *Breeding to Purity and Beyond in Suris*

The Purumbete Suri Cross program has for the last 2 years lived at Tambo Downs Alpaca Stud in East Gippsland. This move was initiated by Jude Anderson and Al Cousill from Pucara Alpaca Stud, who are now running their US alpaca operation in Oregon. We took over the breeding program when we acquired a third share of the herd. The Purumbete suri cross program began with Roger & Sue Haldane and the late Clive Haldane in 1996 and in 2000 it was purchased by Jude Anderson and Al Cousill of Pucara Alpaca Stud.

On the first move to Pucara there were 53 huacayas, 27 F1 and 3 BC1 and 5 pure suris, plus 2 homozygous suri males, White Opal and Doremus; totalling a herd of 100 – 98 females and 2 males.

Following the purchase by Jude and Al, they introduced their USA imported homozygous males, ILR Cadete, ILR Top Hat, ILR Bentley and Pucara Allegro. Fortunately all of these males have confirmed homozygosity for the suri gene and they had the good fortune to put them over so many huacayas and F1 suris. The program is now up to 5<sup>th</sup> generation, well beyond pure suri, defined as 4<sup>th</sup> generation. As Pierre Baychelier says in his article *Alpacas Australia*, issue 51, page 50 - majority of other breed societies accept 15/16 as pure.

Now in July 2008 the Purumbete herd is made up of – 11 F1, 11 BC1, 9 BC2, 7 BC3, 5 BC4 - Females and 6 males of stud potential. No original huacayas are left. We are now up to the 5<sup>th</sup> generation or BC4s and this has taken 12 years! We have introduced more homozygous males into the program, such as Pucara Otis, Pucara Pipeline, Pucara Waikiki and Pucara Halcyon.

Halcyon although white, produces coloured suris out of coloured dams and has been a bonus for us. He has produced 3 black progeny over dark brown females.

On arriving to the 4<sup>th</sup> generation, there was enough history in front of us to start seriously identifying the lines with propensity of the best suri traits we were looking for. This was done with our own understanding and guidance of Jude Anderson and Al Cousill.

Over the 12 years particular breeding lines within the herd demonstrating various fleece traits have been established. From these lines the nucleus of the herd has been determined. We have been able to use males to combine these superior traits to link density with fineness, lustre and greasy handle.

It has been the policy of the Purumbete crossing program to sell off the F1 and BC1 generations, as the herd moves further forward to purity. We have also been vigilant about removing the males from the program to avoid any risk of a huacaya popping up! It is only now that we are closer to achieving purity that we may consider using a male from the program.

As we achieve higher levels of suri gene homozygosity in the females, the fleece qualities have markedly moved from the F1 heterozygous suris in terms of lustre locking, density and over all type.

The tell tale signs of a F1 suri are generally the fluffy, voluminous type fleece that has no real structure or density to the lock, as well as little to low lustre. Although we have produced some stunning F1 cria, we also know 2 pure suri don't always produce the stunning offspring we expect all the time.

It is too easy to forget how long it has taken to produce suri generations to advance a herd. For example – it can take a second cross (BC1) six to seven years to produce

from huacaya, considering the original huacaya dam has a 50/50 chance of having a female cria. Then that female first cross has to be mature enough and at about 2½ years old to have a cria and there is a chance it may be a boy! On top of that we are chasing quality not just generational advancement. It all depends on the quality and the prepotency of the parents we have to work with. This of course applies to all alpacas and all breeding programs.

We have been excited to see no huacayas ever born in the Purumbete crossing program. It wasn't long before good suri crosses looked phenotypically every bit like a lot of pure suris. We have Purumbete Diamante and Purumbete Chanel, Purumbete Tiffany, Purumbete Ice Crystal – all have ribboned at the Royal Melbourne Show. Some of these at the National Show in the last 3 years. The show catalogues never refer to suris as being crosses, we have always been happy to have our crossing program endorsed in the show ring with a ribbon, especially when Purumbete Chanel went on to win 2005 National Junior Reserve Champion Female. She has just given us a beautiful BC3 pure suri female cria.

We can all talk about our own herds, but what is unique about the Purumbete herd? Every suri has originated from a huacaya dam, only homozygous males for the suri gene have ever been used. This is amazing in itself, when 12 years ago many suri males were unproven for the suri gene. It has moved from Bellbrae to Tambo Downs, running as a separate herd. Breeders have the opportunity to see and observe the generations of suri together from great great grandmother down to fifth generation cria and see the herd evolving. This is unique because it all originated from huacayas, and only homozygous males have ever been used, so that the huacaya gene has never been reintroduced back into the breeding program, as so often can be done if heterozygous males are used. Using a heterozygous male prevents the terminology of back cross being used as an accurate description. A backcross means a suri is crossed back with only a homozygous male to produce the next generation towards purity. When a heterozygous male is used at any stage in a progression of crossing, you can only claim F1, F2, F3 status and not BC1, BC2, and BC3. In this case BC1 **is not the same** as an F2 because the percentage of suri gene will always be mathematically greater in a herd bred with homozygous males for suri gene in the next generation and then the **correct terminology** can be used as a B1, BC2 etc.

- F1 x F1 = F2
- Homozygous suri x F1 = BC1
- Homozygous suri x BC1 = BC2
- Homozygous suri x BC2 = BC3

Too often in the industry, the incorrect terminology is being used to define the genetics of the suri purity. If a heterozygous male is ever used in a breeding program, BC1, BC2 etc is incorrect and misleading to describe the outcome and does not reflect the true suri percentage of purity because the huacaya gene is being reintroduced and not eliminated. The use of a heterozygous male in your breeding program diminishes the suri gene, and one never knows the degree of suri purity you have in your herd, mathematically.

Some breeders do choose to use heterozygous males for the suri gene, for many reasons, known to themselves, but if you are wanting a pure suri outcome, it is a very long pathway to get your end result. It has taken the Purumbete herd 12 years to reach 5<sup>th</sup> generation; we just don't have time to delay our breeding goals.

Reference: Homozygous suri in Alpaca Breeding – Dr Pierre Baychelier, Alpacas Australia issue 42, 2003 page 30

What is Pure suri – Dr Pierre Baychelier, Alpacas Australian issue 39, 2002 Page 30-33