Assessment for stud male selection

Eric Hoffman *is the primary author of The Complete Alpaca Book, the book referred to as 'The Alpaca Bible' by Derek Michell, the CEO of Michell & CIA in Peru. Eric has just completed the revised, second edition, which includes two additional authors and extensive input from fibre processors in Peru and new findings by fibre scientists at universities in the United States. New areas of coverage include new technologies for assessing fibre, microscopic looks at fibre and details on the international trade of alpaca fibre, plus new information on digestive tract disorders, and the latest treatments for newly discovered and old diseases. Here, Eric Hoffman outlines a programme for evaluating the potential of a stud male before letting them loose on your females.*

Just last week a new alpaca owner phoned to announce she had purchased, "an outstanding stud, from some of the best bloodlines in the country." She told me his father had won several show ribbons and his name was well known. She was surprised I'd never heard of the animal. Clearly I was not up to speed on the latest stars in the alpaca business.

The caller went on to describe that this perfect animal had an underbite. "How much of an under bite," I asked. "What was the measurement? Was the underbite more than 3 millimeters?" The response was not surprising. "Heck, if I know. I don't know how to measure it, but his teeth touch his upper jaw about one half inch behind the front of the pallet." With further discussion we guessed the underbite to be about 15 millimeters, far in excess of what would be allowed by the most liberal screening standards applied anywhere in the world. The woman had paid more than $10,000 for this young male and had relied on advertising and show ribbons of the sire to determine his quality. Her alpaca had never been shown or had a veterinary exam for overall soundness.

THE IMPORTANCE OF STUD SELECTION

Stud selection is arguably the single most important animal selection decision an owner will make. Every year in every herd 50% of the genetic material comes from males. Over time it is likely that the percentage will be much higher because often one male will be used repeatedly on a group of females.

USE OBJECTIVE INFORMATION

Before continuing I must explain my scepticism about relying on show results and advertising to make breeding decisions, and my bias towards a quantifiable form of measurement, which evaluates animals in a dispassionate and objective way. I believe shows can be wonderful events. Shows provide an arena for breeders to present the outcome of their breeding programmes. They make the people who win feel good and they offer wonderful photo and promotional opportunities. I feel strongly that new breeders especially need to recognise that shows are not always an impartial forum for evaluating an animal. There are differences between individual judges in knowledge and preference that can be significant, and in the end, a judge's evaluation is an opinion measured against animals competing in a particular class on a particular day. Judging is one way to choose superior males but there are other ways to evaluate males that I believe are objective and readily useable by anyone.

OBJECTIVELY ASSESSING ESSENTIAL CRITERIA

Objective measurement involves minimising opinion, ignoring advertising and making as much of your assessment of a stud as quantifiable and dispassionate as possible. It may surprise people, who have entered the alpaca business since 1998, to learn a species (Vicugna pacos) description exists and has been used since 1996 to evaluate more than 15,000 alpacas being screened from Bolivia, Chile, Peru, Australia, New Zealand, Canada, Switzerland, Sweden, Germany, the United States and other places. These forms were created as an attempt to objectively describe an acceptable alpaca, and are not the definitive statement on the subject of evaluating males. However, these forms offer the reader a frame of reference and an approach to evaluating an animal in its totality, taking into consideration a wide range of important variables. Like all systems, new knowledge and a changing consensus may amend any such approach. Nevertheless, here's how this system works.

These forms, originally known as the ARI screening forms were developed with input from knowledgeable alpaca research and field veterinarians as well as industry leaders not involved with animal importation, in meetings held at the University of California at Davis School of Veterinary Medicine and Oregon State University in l996 and l997. Pages 558 – 562 in *The Complete Alpaca Book* show the British Camelids Inc. screening forms, which were borrowed directly from the original Alpaca Registry Inc. You may find it useful to copy them for your own use. Currently the Australian Alpaca Association's Application and Veterinary Report for Male Certification (page 568, *The Complete Alpaca Book*), is derived from the same ARI screening forms. The material can also be referenced in Volume 1, Number 2, Summer/Fall 1996 issue of the Alpaca Registry Journal and in an amended form in Volume III Number I Spring l998.

The original forms were modified as more was learned through screening thousands of alpacas. I like the forms because they assess an animal in its entirety: phenotype, structural soundness, over-all health, parameters for height and weight, heart, sexual development, and fibre quality. Most of this assessment is done by measurement and at the end of its evaluation each animal has a four-page assessment covering a long list of subtle and not so subtle defects common to alpacas. Because the information collected is recorded and the result of an objective evaluation, any person should be able to match the forms to the animal and come up with the same conclusions. However, some of the areas evaluated can change over time: such as body condition, histogram results, and incisor alignment. Nevertheless on the day the animal is evaluated the information collected should be very close to irrefutable and not based on opinion.

This system has two levels of somewhat overlapping and complimentary evaluation. On the physical evaluation form a veterinarian assesses the animal from stem to stern. Their job is to identify the presence or absence of a long list of defects ranging from the tiniest cataract, to an undershot or overshot jaw, slight wry face, partial choanal atresia, hernias, fused ears, and more. The veterinarian applies the same vigilance to neck and body, front and rear limbs, reproductive organs (size, consistency and placement), and cardiovascular system. All findings are recorded, if any of a wide range of defects is found the animal is disqualified from entering the gene pool.

The second level of assessment in this system involves the job of the pheno-type screener who evaluates alpaca phenotypic characteristics such as shape of the head, general muzzle length and ear shape. Also, the evaluator notes the defects s/he finds, and deducts the points for the defect from a total of 100. This evaluator also body scores, weighs, and measures the withers height, takes a fibre sample, judges density of each animal and deducts points for conformation, balance and loco-motion defects for more than 50 different abnormal conditions. In general the point deductions are for defects that aren't severe enough to warrant immediate elimination. Usually two moderate point deductions (10 points for each) results in disqualification. Such items as mild to moderate sickle hocked (135 to 130 degrees respectively) and post leggedness, would fall into this area of evaluation as well as weak pasterns, poor body condition, obesity, and locomotion defects such as excessive winging. The conformation and phenotype point system make up 55 possible points. The rest of the 45

points comes from a fibre sample that is taken from the midside of each animal and sent to Yocum-McColl Testing Laboratory to be Laserscan tested for average micron diameter, standard deviation, microns greater than 30 um (prickle factor) additionally, points are either awarded or deducted based on density in huacayas and lustre in suris. Animals with more than a 20-point deduction are disqualified from the gene pool.

LEG ASSESSMENT

We have all heard an animal described as cow hocked, knock kneed or sickle hocked but what does this mean? Is the defect slight, moderate or severe? Clearly a slight deviancy from total perfection is not as big a concern as a radical deviation that will result in a crippling disability. The screening forms take into account that there is a gradient for assessing leg defects. For example, a deviancy of only 5 degrees or less on a pair of front legs is considered slight and receives a three-point deduction. An animal with this fault but solid in all other aspects is still a viable phenotype. However, if the angulation in the front limbs were 20 degrees the animal would be disqualified on the physical characteristics and kept from the gene pool. This severe a defect runs the risk of developing into a crippling condition according to many camelid savvy veterinarians.

How do you know exactly what the angle is? This is simpler than you might imagine. Veterinarians Brad Smith and Karen Timm, two mainstays of the screening programme through the l990's, devised easily made templates for measuring joint angles. A series of angles is drawn on a sheet of transparent plastic. By looking through the transparency at the joint of an animal, an evaluator can judge the angle to within a few degrees —- in other words an objective measurement can be achieved. If the legs are too heavily covered in fibre to assess them accurately wrap the legs with vet wrap to expose the leg structure.

TESTICULAR EVALUATION

Walter Bravo PhD, Ahmed Tibary PhD, DMV, Dipl ACT, Brad Smith DVM, PhD, and others well acquainted with South American camelids have all gone on record on the importance of testicle size and its influence on male fertility. Generally the bigger the testicles the more potent the male.

But, what is an acceptable size? The scientific input that went into the screening forms came up with 3.0 centimetres (longitudinal) as a minimum acceptable size for an adult alpaca. It is not uncommon to find animals with 5 to 7 centimetre testicles which, if healthy, would be desirable providing the rest of the male measures up to minimum overall standards. Testicle size is easy to measure with calipers. In Australia when a show judge has two equal males s/he places the one with the largest testicles ahead of its competitor. Dr. Ahmed Tibary at Washington State University is a leading expert in camelid reproduction in North America. In "Male Reproduction" Chapter 12 in *The Complete Alpaca Book* he outlines normal testicular function and presents a long list of abnormalities that can occur in both the physical aspects of testicles and their function, including the analysis of healthy sperm. Some of these abnormalities such as testicular asymmetry (one small testicle and one large one) or crypt orchid (one testicle) are readily apparent to someone with experience in any kind of livestock. However, when considering the purchase of an expensive male, having a hands-on evaluation by a reproduction expert would be a good idea. A detailed assessment of a stud's testicles can include ultrasound, sperm analysis and testicular biopsy.

Any discussion of testicles must include an assessment of young and maturing alpacas. When are measurements important? This may be a harder question to answer than originally thought. Not all animals mature at the same rate. Hormonal activity in a young male affects testicular development. Although a three year-old should have fully functional testicles, testicles may not reach their full size until he is a five year-old. The important thing to keep track of in young males is that there are two equal sized testicles of desired consistency easily palpable and correctly placed.

FIBRE EVALUATION

The production of luxury fibre is the ultimate outcome of a successful breeding programme. The most important fibre qualities for processing are fineness, and low variability in the fleece, or in subjective terms excellent handle. In selecting males, attempting to identify low micron, low variability (sd) males with good fleece weights is essential. Increasing fleece weight while maintaining low microns is a significant challenge in all fibre bearing animals. When writing *The Complete Alpaca Book*, I attempted to identify an alpaca species optimum balance between fleece weight and low microns. Records from Isabel Quicano DVC, who represents Consejo Nacional de Camelidos Sud Americanos (CONACS) in the alpaca rich Puno District in Peru believes a realistic optimum total fleece weight (resulting from a year's growth period) is between 7 and 8 pounds at about 23 microns in a year. Julio Cuba, the president of Rural Alianza (39,000 alpacas) feels it is possible to produce 9-pound fleeces at 23 microns. There are males on record producing more than 12 pounds of fleece at 20 to 24 microns in a 12-month growing period. Generally fleece weight falls off sharply with very fine animals. For example, a vicuna, the wild progenitor to the alpaca, has a 500-gram fleece weight with an incredibly low 12 to 14 micron fleece. There are alpacas in the 6 to 7 pound annual weight range with 16 and 18-micron fleeces, but these animals are rare past three years of age. Assessing fleece weight is only useful if the beginning date following a shearing and ending date (next shearing) are accurately recorded. Finding males with low microns and high fleece weights that are also impervious, or semi-impervious to their fibre coarsening due to dietary change and the passage of time is even more difficult than identifying animals that may peak at an optimum level and then coarsen rapidly. In most alpacas environmental factors affect fibre characteristics. Several sources report that fibre can coarsen at an average rate of 3 or more microns in less than a year, but there are bloodlines that seem to resist this coarsening.

Histograms using a laserscan are the most accurate form of fibre measurement in use today. However, the use of histograms can be misleading and measurements in other aspects of fibre can be distorted if parameters for optimum measurement aren't considered. George Davis MagrSc, DSc, a senior scientist with Agresearch in New Zealand, has produced research showing the most accurate and useful histogram in an alpaca's lifetime is the one taken after the first shearing at the time the animal is regenerating its second fleece. According to Davis this histogram has the highest correlation with future fibre characteristics, not the tui histogram (cria or young adult before it's first shearing), which is the hands on favourite because it will usually be the most desirable histogram recorded in an animal's lifetime. In the area of fibre it also is worthwhile to measure the staple regeneration within a set time frame (perhaps a year) and learn to assess fleece density by hand. Density and regeneration add up to weight so assessing these two qualities will help in the overall selection of males.

TEMPERAMENT AND BEHAVIOR

Temperament and behaviour are often over looked when evaluating stud prospects. In wild camelids belligerence, intolerance and sexual prowess seem to be prerequisites to being a successful territorial male. In domestic alpacas and llamas it is possible to be an efficient breeder but not overly aggressive towards other males. In part, inherent male aggression can be managed if males are kept from common fences with females and maintained as bachelor groups at all times other than breeding. A male that is totally intolerant towards other males and always wanting to fight can be both a housing problem and a turn-off to people viewing alpacas for the first time. Try to select the calm, proud animal that breeds readily but would rather not fight.

Breeding behaviour is also worth assessing. Most mature males behave in a predictable way and will readily breed open females and quickly back off from bred females. However, there are males that aren't predictable. These males may be sporadic breeders and refuse to breed particular animals or stop breeding at the slightest disturbance. In young males, erratic behaviour may disappear with experience. There are also males who are overly aggressive towards females and seem to confuse breeding and fighting. These males will attack females and intermittently attempt to breed. There are environmental factors that can contribute to

undesirable behaviour, but some of this behaviour appears to be inherited. And, there are rare males who although normally docile, become aggressive with people once they begin breeding. It is important to select males who are persistent, predictable and easy to manage.

PHENOTYPE, GENOTYPE AND STUD TRIALS

In North America animals are often advertised aggressively and to a large extent, their appearance (phenotype) determines their value. The genotype is the genetic material the animal actually possesses. This usually includes hidden genes that have not presented themselves in the phenotype. These hidden genes can carry both desirable and undesirable traits. There have been disasters in all forms of livestock where more attention was paid to phenotype than genotype. Widespread dwarfism in Hereford cattle, spread by selecting good-looking bulls that also carried dwarfism as donors, is one such example. In alpacas, publicised males have sometimes produced unwanted traits, such as choanal atresia and polydactylism.

In other forms of livestock (particularly cattle breeds) animals singled out to be studs must go through a breeding trial that often entails breeding hundreds of females with no evidence of producing genetic defects before stud certification occurs. With alpacas these types of scientifically designed trials don't exist. However, with the use of a DNA based registry people evaluating a male can find offspring and evaluate them. However, such evaluations should include all offspring not just those put forth by a seller.

CONCLUSION

Nobody, I know, is suggesting the screening requirements applied to so many animals leaving South America from l995 until the present (in country's outside of North America) should be applied to registry herds in the United States, Canada, New Zealand, Australia, or Europe, but there is a lesson learned here that can be applied to stud valuation. The accurate assessment of essential criteria to ensure structural soundness, overall health and excellent fibre can be done in an objective dispassionate manner. In my opinion the fibre evaluation needs to be done objectively and scientifically and the criteria evaluated needs to be incorruptible and essential to manufacturing.

A system like the one outlined above can be modified as new knowledge becomes available, but amendments need to focus on ensuring structural soundness, health and fibre quality and avoid fads and marketing pressures if it is to survive and remain objective. Using objective information and noting relevant behavioural traits should allow breeders to select outstanding males to create and maintain successful breeding programmes.