



Designing Your Own Alpaca Breeding Plan

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It is an alpaca breeder's dream to breed the superfine 16 micron alpaca cutting a 6kg fleece. Progress towards this goal is ultimately possible with a well-designed breeding plan. To achieve your vision of the most perfect alpaca ever bred, it is necessary to have a plan that sets out *what you want to achieve genetically* and *specifies how you plan to get there*. The following article discusses the main elements involved in designing an alpaca breeding plan and the decisions that need to be made along the way.

Breeding Objectives

Setting your breeding objectives is the first step designing an alpaca improvement plan. The breeding objectives are guides that help you select animals that will increase your long-term profit from either fleece or animal sales.

This means that we must decide what traits need to be improved in our animals to achieve our vision. Also, we need to know how important the different traits are in relation to each other.

The determination of breeding objectives is a very individualistic thing with no one breeder having exactly the same objective. We need to look 5 to 10 years into the future, so we can work out what our future customers will value in our animals and fleeces. Also we need to be able to speculate about the changes in fashions and consumer spending patterns that will occur over this time period.

Changes to our Industry - Present & Future?

At the risk of being controversial, I would like to put forward some issues that need to be addressed over the next 5 years. How you view these issues affects how you develop your breeding objectives.

- Declining price of breeding females (except at the elite end) means that the annual fleece income produced must improve through some combination of lower fibre diameters & higher fleece weights.
- Associated with the previous point, is the urgent need to minimise the annual increase in micron. I believe that our 5 year old animals must still be producing fleeces less than 25 μ . What's to be determined is the best way of addressing this problem.

Why do we Need Breeding Objectives?

Long-term breeding objectives are critical because:

- they help set our long-term production goals.
- they help us make faster genetic progress.

- they allow us to compare the rate of improvement in our breeding program.

Examples of Different Breeding Objectives

Unlike merino flocks, there is significant variation in alpacas for fibre diameter (FD) & fleece weight (FW) across each age group & between different age groups. The following breeding objectives show the rate of progress that can be achieved over a 10 year period.

1. A significant reduction in micron & maintenance of fleece weight.
2. A significant increase in fleece weight & maintenance of micron.
3. A smaller reduction in micron and a smaller increase in fleece weight.

Selection Criteria

The 2nd step in designing your breeding plan is to decide what traits you will use to select the parents of the next generation. The traits used depend on your views towards objective measurement (the AGE program) & visual assessment approaches including SRS®.

The objective measurement approach would chose traits such as fibre diameter and greasy fleece weight (GFW). The SRS® approach would choose traits such as lustre, handle, fibre bundles and deep & bold crimp (huacayas only) as proponents believe that selecting for these traits is the most effective way of making progress with FD & GFW.

Whatever approach you take, to make satisfactory genetic progress, the traits you use must have the following properties:

- high degree of heritability - both micron and fleece weight are highly heritable.
- high degree of variability in the trait.
- have a strong impact on fleece value or animal sales - chief ones are micron, fleece weight and

fertility.

How Traits effect each Other Traits

As breeders, we need to be aware that the set of genes that control one particular trait may have both a positive or negative impact on the set of genes that control another trait.

The clearest example of this in Alpacas is the link between micron and fleece weight. Both these traits are highly heritable (heritability is basically the proportion of the phenotype passed on to the progeny). But unfortunately there is a positive link between fleece weight and fibre diameter. So if you breed solely for finer animals there is a strong risk that fleece weight will decline as well. So what we need to do is to have some way of identifying superior males that have below average micron and above average fleece weight.

Estimation of Breeding Values

As we are dealing with thousands of invisible genes, we need some way of estimating the true genetic merit of our animals. This can be done in a number of different ways.

- Can be based on an animal's phenotype. This can be accurate with highly heritable traits. However reliance solely on phenotype means it is very difficult to compare the results of males across different herds. The main problem is that it is impossible to separate management practices in different herds from genetic factors.
- An alternative approach is to use some form of Estimated Breeding Values (EBVs) and selection indexes to evaluate the merit of progeny across different herds. This allows you to identify males that have a desired combination of traits based on the performance of their progeny across different breeder's herds. The AGE program is an example of this approach.

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