

# Venison Genetics

## group experiences

### 1. Dual purpose (venison and velvet)

Farmer "Cutting 2yo stags, 2.5kg grow out to 3yo - all came from venison genetics"  
Choosing 50% on body size and 50% on velvet

### 2. Use of wapiti/elk terminal sires

Have to feed lactating hind well to perform  
Lack of historical objective data and consistency  
Wapiti now coming onto DeerSelect with progeny testing  
Mating management to achieve high conception rates

### 3. Use of part wapiti in breeding hinds

Need to feed the hinds more than straight red  
Can be more challenging to achieve high conception rates  
Farmer "Have taken wap/elk out and gone to straight red and making gains."

### 4. DeerSelect

[www/deernz.org/deerselect](http://www.deernz.org/deerselect)  
Now can rank on eye muscle area  
Good and increasing options as more traits come on board  
Wapiti not yet on deselect but getting there and also measuring EMA  
Wapiti will be able to be compared as an alternative terminal sire to high growth BV reds.

### 5. Use of AI

Extensively used on studs, along with ET. Using BVs and AB rapidly extended rate of genetic gain for growth in the Deer Improvement herd.  
Can make faster genetic gain

### 6. Rate of genetic gain

Fastest in studs mating the best with the best and using progeny testing information  
Breeding from youngest hinds and stags increases rate of genetic gain  
Trade off with breeding older hinds that consistently produce a good fawn every year  
Cost-return of rearing a hind to 2 year old before producing first fawn  
Fastest genetic gain is made when selecting for a single trait. E.g. 12 month liveweight. Some studs have made very fast genetic gain selecting for this one trait, however, now that other traits are being measured and ranked, these animals may not be the top performers across all the desirable traits.  
It is easy to get into a cycle of inbreeding when mating the best with the best. Using unrelated genetics may slow the rate of genetic gain.

### General Advice

Velvet genetics are easy to select for because velvet is highly heritable and highly visible. Selecting a sire stag with the velvet traits that are desired will result in a large percentage of his progeny, both male and female gaining those traits and passing them on to their respective offspring. Weight gain and venison traits are not quite so straightforward and hence the rate of genetic improvement in the

commercial venison industry has not matched that of velvet improvement. However, some studs that have used progeny testing and artificial breeding and carefully selected the best animals have managed to make large gains. For instance the best red deer breeding stags listed on the DeerSelect database have a 12 month live weight that is more than 30kg heavier than animals from the same genetic line around 20 years ago. That is an increase in body weight and respective growth rate of over 30% without the incorporation of wapiti genetics.

The development of DeerSelect and a nationally accessible progeny testing programme has been the impetus for speeding up genetic gain in venison growth rates to 12 months of age. Recent developments in the traits that are being measured and compared has increased the options available to farmers and a one project that has helped make this a reality has been the Deer Progeny Test project.

There are a number of considerations that farmers should take into account when making decisions around breeding animals that will improve the venison production from their farms.

1. Is genetics a limiting factor?
  1. Are you fully feeding the current animals, yet failing to achieve the desired growth rates?
  2. Will you have the means to capitalise on improved genetics through feeding?
  3. In most cases, genetics will be a limiting factor, but it is only part of the equation for achieving profitable deer production. One thing to remember is that there is always potential benefit from genetic improvement because genetic gain is permanent even in a bad year when animals might be underfed.
  
2. Make it profitable
  1. Consider the benefits of a heavier carcass weight and an earlier kill date
  2. Consider the benefits of better pasture utilisation by putting it into growth rate rather than maintenance. For every extra 100g of growth per day, that is 5.5MJ ME going into growth compared to
  3. It is not entirely possible to calculate how much faster the fawns will grow without knowing the breeding values of the existing hinds but if we assume they are say +5 on average and the progeny are also +5
    1. Current 12 month live weight average.
    2. Take the BV of the stag you want to use and add 5 (for the hind) add these together and divide by 2 to find the average BV of the progeny.
    3. Subtract the BV of the original progeny (-5)
    4. This is approximately the extra weight the progeny should be at 12 months in the first year if they are fully fed.

I.e Using a +25BV stags

BV of original progeny = +5

BV of new progeny =  $\frac{25 + 5}{2}$

= 15

This is +10 greater than the original progeny. So a 10kg live weight gain at 12 months of age assuming fully fed.

If the original herd ha a BV of +10, the gain is 7.5kg live weight

Financial benefits of earlier finishing. This should take into account killing on a peak schedule as well as utilising summer pasture for other enterprises such as lambs.

### **3. What other traits are required?**

Early fawning may be desirable when good quality pasture is available in November for lactation and early weaning is desirable (say late February) due to deteriorating late summer pasture. Early fawning can also result in heavier weaning weights.

Selected seasonal growth rate potential to suit your farm environment

#### **Higher winter growth rates**

Winter is the most expensive time to feed animals, particularly when high cost supplements such as baleage or grain are used and/or wintering barns. In many instances, growth rates in young deer do not exceed 100g per day during the winter. The shut down in winter growth rates is driven by day length and hormonal regulation which may have a genetic component. Wapiti deer tend to maintain higher growth rates during the winter.

Calculate the cost of winter feeding and whether animals with higher winter growth rates would be of benefit.

#### **Higher spring growth rates**

If there is plentiful early spring feed available from late August, it may be worthwhile capitalising on this with animals that have a higher potential growth rate in the spring, while using a lower cost wintering system.

#### **Higher weaning weights**

High weaning weights depends on a number of factors with the most important being the genetic potential of the fawn to grow and the fawns demand for milk and high quality feed for the fawn to eat and transition onto while still feeding off its mother. If late summer/early autumn feed is available and of good quality, it may be more beneficial to select for a high weaning weight and a lower cost winter and spring feeding system.

#### **Reproductive performance**

It has been recognised that high BV yearling hinds can be more difficult to get into fawn as 16 month old hinds. Work done by AgResearch has found a strong correlation between the bodyweight of the yearling hinds and their conception rate, with the important factor being percent of mature liveweight. It is generally recognised that a hind should be at least 80% of her mature live weight at mating. For a high BV hind with a mature live weight of 130kg, this would require a minimum mating weight of 104kg. Compared to a hind with a mature live weight of 95kg which would need to be at 76kg at mating. It is best to monitor weight with scales rather than by eye and body condition is also likely to be important. Body condition is important because in a mob of yearling hinds, not all of them will have the same mature live weight and as this is not known for each individual animal, it is impossible to say whether a hind is at 80% of her expected mature weight.

Are you concerned about hinds getting too large and being more difficult to feed and manage and potentially compromising reproductive performance?

Options for overcoming this are to have two select breeding lines, one for replacement hinds and one for terminal. Firstly, clear criteria for replacement hinds should be developed and then the hinds selected

along with the stags that will produce the desired hinds. This does mean that the system is complicated somewhat.

Another option is to buy in yearling hinds from a breeder that is breeding for the traits that you desire in your hinds and mate everything to a terminal. This is a less complicated system but does rely on having a good breeder and also increases the risk of disease and poor quality animals coming onto the property.

What traits are you looking for?

Body size

Good teeth

Fawn survival

Early fawning

Weaning weight

Conformation (e.g. feet, muscling)

Constitution - i.e. able to maintain condition and breed in a relatively harsh climate/environment.

What else?

In most cases, hinds need to be selected based on the fawns that they produce and this will require pairing hinds up. However as only 20% of the herd will be culled at any one time, it may only be necessary to pair up to poorest fawns with their dams. As hinds will also be culled for other reasons, it may be an even smaller number than need to be paired up.

When pairing up hinds and fawns, it needs to be remembered that the fawn that a hind produces one year can be different from a fawn that she produces in a subsequent year and therefore decisions should be based on averages of more than one fawn if possible.

The most accurate way to select hinds is on calculated breeding values based on her sire and dam and relatives. This requires complicated calculations and registering hinds into DeerSelect so that the calculations can be done. A large amount of lineage information as well as performance data is required and therefore this method is only really feasible for studs or farms with high value intensively monitored animals.