

Application of EBVs to the Rabbit Industry



The key to assessing the genetic value of the traits that affect the profitability of rabbit production

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Genetic Evaluation

$$P = G + E$$

- Phenotype = what you look like
- Genotype = what genes you have
- Environment = environment or management effects
 - you only pass on your **GENES** to your progeny
 - therefore it is important to be able to estimate the **genetic value** (or **breeding value**) of breeding animals



$$\text{Phenotype} = \text{Genotype} + \text{Environment}$$

Phenotype = what you see or can measure
e.g. 12 week weight in grams
e.g. number of rabbits weaned

Environment = environmental or management effects that affect production
e.g. litter size at birth
e.g. date of birth

If we **CORRECT** phenotype for these environmental effects we are left with **GENOTYPE** effects (genetic value or **breeding value** of animal)



How do we estimate Genetic Value?

- Collect information on:
 - pedigree
 - management effects
 - environmental effects
 - performance information
- Combine this with:
 - information about heritability
- Calculate genetic (or **breeding values**) for animals to be used as parents



Estimated Breeding Values

- GROWTEC produces estimated breeding values (EBVs) for:
 - growth
 - reproductive traits
- EBVs are estimates of an animals **GENETIC** value
- An animal passes 1/2 its genes to its offspring
 - therefore 1/2 its EBV is passed from a sire or dam to their progeny



Estimated Breeding Values

- An animal with a positive growth EBV (e.g. +6.0 grams per day)
- This animal is genetically faster growing - because EBV is positive
- They will pass on half of this merit to their progeny (e.g. +3.0 grams per day)



Traits used by GROWTEC

- GROWTEC uses EBVs for the following traits which influence profitability:
 - ADG - Average daily gain
 - NB - number of kitten born
 - LitWt - Weight of litter at weaning (28d)

Trait	Min EBV	Max EBV
ADG (grams / day)	-1.87	6.58
NB	-0.75	0.76
LitWt (kg)	-0.39	0.39



Selection Index

- A selection index is useful when breeding for more than one trait
 - e.g. breeding for growth, and fertility
- An index combines the EBVs for all the traits into a single figure
- The emphasis put on each trait depends on **your** breeding objective



Selection Index

- The GROWTEC \$ index has varied emphasis on growth and fertility
 - Combines EBVs and economic weights
 - Economic weights are related to the value of a one unit increase in that trait
 - This results in a single figure for the genetic value of a rabbit



Example EBVs and Index

ID	ADG (g/day)	NB	Lit Wt (Kg)	\$ Index
990001	+ 4.05	+ 0.71	+ 0.13	+79.73
990002	+ 1.86	+ 0.09	+ 0.06	+24.98
990003	+ 0.05	- 0.61	+ 0.07	-28.04



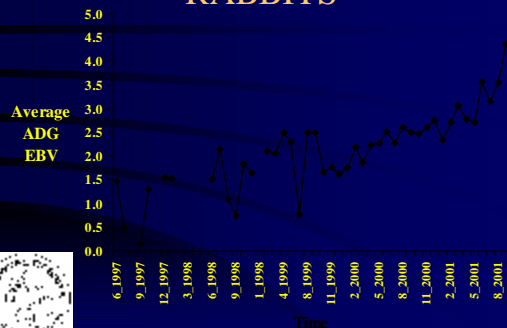
Key Profit Drivers

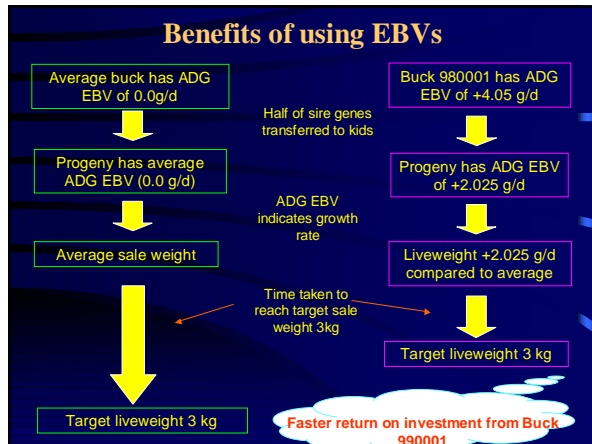
- Litter Size
- Weaning rate
- Growth rates

Focus on the traits that make you **money!**



Genetic Trends - GROWTEC RABBITS






GROWTEC allows rabbit producers to maximise returns from the dollars spent on rabbit seedstock

Higher merit sires produce:

- Rabbits that grow faster

Higher merit dams produce:

- More weaners
- Rabbits with higher growth rates




Something to think about...

Performance = Genotype + Environment

The diagram shows two circular arrows forming a loop. The top arrow points from 'Genotype' to 'Environment' and is labeled 'Good environment can mask poor genes'. The bottom arrow points from 'Environment' to 'Genotype' and is labeled 'Poor environment can mask good genes'.

Buying without knowing both genotype and environment is Risky!



How to Access GROWTEC Information

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