ISSUE
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QUARTERLY NEWSLETTER

NZBGBA

This Issue

Presidents Brief:

Welcome to Issue 10 of our newsletter for October 2016. By now most studs will have started or finished kidding reflecting the choices they made when determining what mating's to use for this season.

As discussed at last year's AGM, the mandate was given to the executive to pursue other options for the management of our pedigree registration system. After looking at other options where the cost of changing was a limiting factor, it has been decided to go with a new provider Genetic Gains. In order for this to happen, ALL members will need to fill in an authority form and return to myself for correlation and sending to the provider. This change will result in more communication and information exchange from both the Bureau and the breeder. This will need to be done BEFORE any registrations of current year's kids are sent to the bureau. The authority form will be sent to you shortly. If you have any queries or concerns, please contact me directly for clarification.

As shown in the last newsletter the standard animal tag identification to be used from 2016 should be as follows

Example:
1234.1601. 1234 is your stud ID with the Bureau, followed by a decimal point.
Then the number with the first 2 digits representing the year, and the remainder of the digits being the animal number.
Your stud ID (1234) will only be shown on the registered pedigrees but you must submit your goat ID as 1601 or 16099 etc. even if you choose to tag your goats simply as 01 or 99.
For exporting purposes it is crucial that the NZBGBA identification system is robust and more importantly we all follow the same system. One of the Executive's responsibilities is to ensure the Registration Database and System is correct so everyone needs to be on board please.

The Canterbury group has been fortunate to secure the services of Kobus Lotter as the judge for the Canterbury A & P Show for 2016. Kobus is the immediate past Vice President of the South African Boer Goat Association and one of their top 5 Boer Goat Judges. In conjunction with the show, the Canterbury Group has organised a breeder's workshop for Saturday 12th November 2016 at Jenny & Guy Bassett's Jaegar Boer Stud at 1532 Tramway Road Sheffield.

Following on from last month export to New Caledonia a part shipment of F2 does went to Sabha. I commend all members involved in pursuing, supplying animals and meeting these orders. Not an easy task in most cases, but hopefully getting New Zealand on the world map as a supplier of high quality premium stock.

Kind Regards
Brian Loughhead - President

2016 NZBGBA South Island Boer Goat Championship

Coming up in November is the Canterbury A&P show and we have the South Island Boer Goat Championship judging of traditional and red boer goats, also a boer goat promotional area and boer goat meat demonstration by chef Mark McCracken in the Food & Wine Marquee.

We hope you will support our show by exhibiting your Boers or helping at the working bee & show and/or coming to watch the judging.

SUNDAY 6 NOV

We would love some assistance with the working bee at the Livestock Pavilion at the A&P Show grounds with setting up the judging ring & laying the carpet, setting up pens, exhibitor numbers & ribbons, etc.

Sunday 6 Nov from 1.30pm – usually takes a couple of hours. **Please let me know if you can help.** Thank you.

WEDNESDAY 9 NOV

Judging – is from 9.30am and usually goes through to mid-afternoon. Agrisea is kindly our sponsor, who has been supporting this show as well as the Wanaka Show for many years. Our judge is Kobus Lotter from South Africa, who we are very privileged to have come and judge, and Stephen Andrews from Waiuku (Auckland) is chief steward. Thank you to our additional stewards who will be checking tag and exhibitor numbers, recording results, etc – Heather, Julie, Colin, & Anna.

Dinner – Lone Star at Bush Inn, Riccarton. Sitting down at 6.30pm, please get there before this as it's a busy venue for other show groups as well. All are welcome to attend this – not just exhibitors.

Please RSVP your name & numbers attending the dinner to canterburyboers@gmail.com

THURSDAY 10 & FRIDAY 11 NOV

Goats are still penned until after 5pm on Friday. We have a promotional tent at the Boer goat section in the Livestock Pavilion on Thursday and Friday and would appreciate any help manning this – answering questions from the public and handing out information.

There will be a Boer goat meat demonstration (one hour slot) on both Thursday and Friday in the Food & Wine Marquee. Check the programme for actual timeslot. This is a joint promotion of NZ Boer Goat Breeders Assn, Shingle Creek Chevon, and Mark McCracken – Executive Chef and part owner of Baretta, The Cuban, & The Empire Bar. We are very fortunate that Mark is demonstrating again for us. He has done this for the last 2 years and is very enjoyable to watch – and the food is delicious! The exhibitors will take a turn at watching as some need to stay to guard the animals from over-keen public and answer questions etc. Friday from about 3.30pm – we start packing up the ring, sweeping and rolling up the carpet, dismantling the promotional area and tidying up our section. If you are around please lend a hand so the exhibitors can get ready to go home after the goats big three day city living.

SATURDAY 12 NOV

Breeders Workshop run by Kobus Lotter held at Guy & Jenny Bassett's, 1532 Tramway Rd, Waddington, Sheffield.

Approximate programme:

10.00	Morning Tea at Bassett's house	Provided
10.30	Covered Yards at neighbours	
1.00	Lunch at Bassett's	Please bring your own lunch. Tea & coffee provided.
2.00	Covered Yards at neighbours / farm walk	
4.00 +	BBQ at Bassett's for those who can stay	Please bring your own refreshments. Meat & salads etc provided.

Cost is $50 per person for the Breeder's Workshop or $60 per person for the Workshop & BBQ. All welcome but **RSVPs are essential please by Sunday 6 Nov or earlier for catering purposes to canterburyboers@gmail.com**

We hope to see you at the upcoming events.

Kind regards

Canterbury Boer Goat Group

c/- Secretary Jenny Bassett

canterburyboers@gmail.com

021 318 369

Foot Note:

Kobus and Loretta Lotter operate Doornpoort Stud and are very experienced breeders of Boer goats, Dorper and Persian sheep.

Kobus is one of the 5 judges on the South African panel responsible for running South African Judges schools and training courses. Until recently Kobus held the position of Vice President of the South African Association and is very well regarded for his knowledge of goats and sheep. Kobus has good knowledge of the Australian / New Zealand Boer goat having judged many Australian shows including the 2014 Sydney Show as well as assessing many of Australia's judges and studs.

New Caledonia Boer Goat Export

Exporting livestock is not or ever will be for every breeder. There are numerous challenges along the way for all breeders which in some cases mean a strong no, right from the initial request to supply. As individual breeders we all have the right to say yes or no and the right to do so without undue pressure from other sources.

Back to the story……the short version.

This started out as an enquiry from a fellow New Zealander who was contracted to shear sheep in New Caledonia way back on 5th January 2015. In all something like 250 emails, many photos, many lost hours of sleep and much satisfaction as the boxes were slowly but surely ticked off.
Along the way the number of goats asked for went from 4 to 6 then 20 and finally 22 although 21 eventually were sent. The client had two requirements that set the tone for the order – must be registered full blood Boer goats and must be genetically varied back to at least three generations.
The first hurdle to overcome was communication as French is the main language in New Caledonia with a little English used. Then to find that the New Caledonia Import protocol had lapsed and would need updating which proved to be very time consuming and challenging for all. Ever tried asking a Government Department to move at speed who ultimately would say yes or no to allowing your project to go ahead.
In the meantime I was asked to prepare an estimate for the entire project based on 6 goats and no firm idea of what the new protocol would demand in the way of quarantine requirements. It soon became apparent that flying them was going to be expensive as we had to modify and then restore an AirNz baggage crate and as they would be freight on a passenger aircraft they would be unloaded if the weight of the aircraft dictated. Added to that was the likelihood of stopping at Sydney which meant another set of costs. Having little control of costs at this point I decided it would be best to run a parallel exercise for sea freight as deck cargo.
Andrew Russo (ABS quarantining vet) went back to MPI for their views on sea freighting the goats which was daunting but possible. Eventually I received confirmation on goat numbers, 5 bucks and 17 does; finally I could make a decision that would rule out flying them in.
That decision was easy in hind sight; committed to deck cargo on a sea freighter meant a totally different set of rules. Because of public perception and the reporting by the press of high mortalities in sheep shipments a full Animal Welfare Export Certificate (AWEC) had to be planned step by step and approved by MPI every step of the way. This involved submitting details about ABS's expertise in quarantining and export management, my expertise as a breeder and even if I had complied with all general farming requests like TB testing, rural statistics surveys, alongside compliant size and design of crate, airflow and weather details, who would be the on board attendant with satisfactory credentials, down to proving that the water supply was OK and for a 5 day voyage could they supply 10 days if something went wrong.

Another setback was finding suitable 2014 born does that would fit their requirements. By the time both sides agreed on contract price, requirements and MPI approval to sea freight it was well into the 2016 breeding season. Couple all that with a very strong breeding doe called Saxon Downs 99 that produced a number of potent progeny who pop up in many pedigrees, my job had just become a lot harder. By the time the New Caledonia breeders had done their homework on pedigrees, they went through 150 plus matings to work out genetic variability we knew we were in a tight spot because does can be no more than 100 days pregnant by shipping date.
Once a list of "bought" goats was confirmed the logistics of organising 4 different vets to co-ordinate pre quarantine entry testing dates and delivery to a central lab suitable to MPI was rolled out, at the same time organising trucking up from the deep south in winter.

After two failed attempts and the drama with that, we managed to beat one of the notorious Antarctic winter fronts up the country… goats left Christchurch after an unplanned 2 day stay at 10am and the front closed Christchurch Airport and many local roads at 1 pm. We unloaded the goats at the quarantine centre that was to be their home for the next 5 weeks during the start of the very wet front 2 days later.

Quarantining goats for export during late July and August is not easy in the Waikato. I can only say the decision by Andrew to do so at their property in Whitehall was definitely one of his best. Up on slats in a warm, well protected woolshed the goats settled well, I had the job of raking out the not needed winter coats for respectability every Friday.

As we ticked off the boxes during quarantine I was stressing over ships. Every ship that was a maybe had an issue, the loading crane did not work, one was calling into Australian ports on the way back to Noumea, MPI refused one on past experiences and some just not suitable. Finally the shipping agent found a ship that was suitable but would it be here in time for exit of quarantine and could the on board ship attendant be here in time as well. The on board attendant was Dr Denis Chilou, a New Caledonia UPRA Leader and vet who flew into Auckland on Saturday but did not board the ship until the following Friday afternoon.

The goats were released for export on Thursday morning with one “off colour doe” to decide on prior to load out.

Very early Friday morning Osborne Transport special goat transporter arrived after a 5 hour water blast and sanitation, Andrew and I decided not to send the unwell goat as we wanted a 100% pass rate for the entire project, while the MPI vet cleared the remaining 21 goats.

Once on the road the realisation that a project that started over 18 months ago was rapidly drawing to a conclusion hit us. With no delays, we arrived at the Port of Auckland in good time and went through all the necessary paperwork. The goats caused much excitement as it is not every day a bunch of goats turn up to the wharf to be loaded for Noumea with many photos being taken.

RBI as freight forwarders had everything lined up from crate, MPI final inspection, port paperwork, loading of goats, to ship boarding pass for Dr Denis Chilou. The night before load out we were still dealing with MPI requirements, even though they had inspected the crate at the makers premises a day earlier they suddenly required a full crate to ship survey report which added an extra $1100 to the cost, I had no say in the matter as without this MPI would not give clearance to leave.

I can clearly remember Andrews comments as the crate of goats was lifted over the ships rail…….I am very nervous Warwick, that is a lot of our time and effort hanging 30m up in the air – rightfully so Andrew I replied and well worth the very steep learning curve.

To the breeders whose Boer goats are now adding to the New Caledonia gene pool many thanks for your cooperation and patience but most of all your understanding that it was going to be two steps forward and one back. The one thing I kept from you all was the fact that we were always pushing the Ministry of Primary Industries boundaries to make this project a success the moment it became apparent that sea freighting was the only option. There were days when I wanted to hide in a hole and days when I want to shout from the roof tops.

Denis Chilou and crate

Andrew reading tag ID

My one wish was for you all to be at the Port of Auckland when the crate load of goats was finally hoisted up and over the ships side and placed in its position.
Without the expertise and determination of Andrew Russow, Animal Breeding Services (quarantining vet and co-ordinator) I doubt the goats would have been allowed to leave New Zealand.
To the MPI leaders who allowed us to push the boundaries, offered us solutions and support I hope we have proved that sea freighting small numbers of small livestock is possible and can be done without any deaths.
As for Greta van Zyll (MPI co-ordinating vet) thank you for your professionalism and understanding about the importance of this project.
Having worked with my email contact, New Caledonian Jean Marc Devillers for over 18 months this project would have struggled to be completed if it was not for his commitment, understanding and perseverance. Being able to meet Dr Denis Chilou at the Auckland Port and hand over the responsibility of taking his precious crate of Boer Goats home was worth a day off work.
Bring on the next Export project…..well maybe.
Warwick Ferguson

Update:
Upon entry to New Caledonia we knew the goats would have another 15 days quarantine to pass which should have presented no issues. The Import Protocol did not state that a zero egg count was needed to release them from this quarantine, just that they had to have been drenched in NZ. This oversight was to further increase the quarantine period and resulted in 5 does kidding in quarantine. Today I received an email from New Caledonia saying… The Boers are Free!!!!!

Note:
It really is a small world, during this project I discovered that Andrew lived next door to a very good family friend and got married in the Lavender farm, 100m away from me.
Greta van Zyll the controlling MPI vet who did all the Hamilton pre entry and quarantining tests did her internship in a small vet practice in the Kimberley region of South Africa. One of their clients was a talented Boer goat breeder called Theuns Botha. The young Theuns she described to me is the same as the older version I call my friend. Theuns is judging the Boer goats at the 2017 Wanaka Show ….early March.

Commercial Doe Export

After an enquiry from an Australian Exporter for F2 and above commercial style breeding does, Dougal Laidlaw successfully sourced just over 100 does at short notice. These does were then transported to ABS at Hamilton, visually inspected, various treatments and injections given over a three day period before joining a load of livestock heading for Sabah.
At the time of writing Dougal was informed that another shipment for 500 does minimum is scheduled for mid-November. This could change at any time due to International pressure on exchange rates, fuel costs etc.

KIDPLAN – CAN IT IMPROVE YOUR BREEDING AND PROFITABILITY?

Or

"CAN YOU JUDGE A BOOK BY ITS COVER"

A growing number of breeders are using KIDPLAN, Estimated Breeding Values and Indices, and an increasing number of goat buyers are demanding solid data on the animals and genetics they buy. This begs the questions in the title: What could KIDPLAN do for me? Could it improve the animals in my herd and the profitability of my enterprise? How much time, effort and money would it take? Assessing a goat is a bit like assessing a book. You can judge a book by its cover, or by checking the blurb on the inside page, or by reading the text. All these are valid and helpful, but they give you different views of the book. And so it is with goats. You can assess an animal by its appearance. You can take some 'objective measurements' on a particular day; or you can assess its genetic merit in detail. Experts can judge the visible aspects of a goat and objective measurements are interesting. But the real value of an animal lies in its progeny, not in itself, and its ability to throw good progeny is determined by its genes, combined with those of its mate. The genetic recipe that defines those progeny is not visible to the naked eye and is usually obscured by all sorts of non-genetic 'environmental' factors (such as early nutrition or litter size). Like the text in the book, it can only be unravelled by going through it in detail, over time, together with the data on all known ancestors, relatives and progeny, carefully eliminating all the 'environmental' factors.

So the real genetic value of a goat can only be assessed by 'progeny testing'. One of the World's leading institutes for quantitative progeny testing and genetic selection of animals, including goats, is based at UNE in Armidale, NSW. The Sheep Genetics organisation, through its LAMBPLAN program, produces the breeding data that has helped to transform the fat lamb industry over the past 20 years. The sister program KIDPLAN started in the late 1980's, collecting and processing data on meat goats and assessing the productive potential of newly imported genetics. After a promising start, KIDPLAN fell out of fashion from the late 1990s until about 2005, but there is now a resurgence of interest. Seven Boer studs have been using the KIDPLAN system in Australia and NZ - Cadenza, Crusader, Currabunga, Dudauman, Terramac (incorporating Macgregors and Terraweena), Tambookie and Winfield - and another three are overseas. Most are members of the Boer Select Breeders Group.

The KIDPLAN system reports genetic merit as Estimated Breeding Values ("EBVs") and Indices, and there is a variety of these which cover a broad range of the animal's characteristics. While leaving the breeding strategy and decisions to you, those EBVs and Indices will provide information on the traits you are interested in and help you decide which animal will best develop those traits in your herd. An animal that has a higher EBV or Index for a particular characteristic has higher genetic potential for improving that particular characteristic. To illustrate, a buck that has a higher Carcase Plus Index will tend to produce kids that grow better carcases faster up to the age of about 9-12 months than another one that has a lower Carcase Plus Index. Or, if you are having trouble with over-sized kids at birth, the Birth Weight EBV will help you select a sire that will throw kids with lower birth weights. Worm egg count EBVs will soon tell you which of your animals is lowering the worm resistance of your herd, causing you all that pain in the drenching race, and will help you find a buck to improve the situation.
One great benefit of KIDPLAN is that it ranks all the animals in your herd and compares them to other herds. That allows you to select the best you have, avoid the worst, and find an outside animal that will bring in improvements. The basic data required is simple and is already recorded systematically in many studs. Pedigrees, birth type, rearing type and weaning weights are most important. Birth weights and other weights up to one year old are very helpful. Neither registrations nor full-blood status are necessary. True KIDPLAN EBVs or Indices can only be obtained by submitting extensive data over an extended time to the Sheep Genetics organisation.
Herds suitable for KIDPLAN would ideally:

- Be based on a sizable number of animals (say > 50 kids born per year from multiple bucks).
- Have pedigree records.
- Submit as much information on progeny and relatives as possible.
- Identify which animals have been exposed to different environmental influences (such as some animals being offered grain while others are not).

Critics of EBVs typically make two objections. First, "It's a lot of work". That's true, but it is interesting and rewarding work. Second, "If you use numbers to select animals, you will end up with an ugly, unsound animal." That's nonsense. Your selection for appearance and structure should be just as stringent as it is now – the numbers are an additional tool to be used together with the normal visual ones, including classification. Most breeders finish up giving roughly equal weight to visual and numerical information. Some studs find 'objective measurements' to be useful for marketing and even breeding. But these are not true KIDPLAN EBVs and they give a limited perspective on the production value or genetic merit of the animal. In particular, true KIDPLAN EBVs cannot be calculated from data obtained in a single episode (at a show, for example) or from a group of animals that have not been treated identically. If, for example, you scan eye-muscle depth (EMD) on a line of yearlings (or kids at a show) and use that for selection purposes, you may well end up selecting the one with the highest measurement. But you will not know how it got that thick eye muscle or whether it can pass that trait to its progeny. Is the animal genetically programmed for muscularity? Is the EMD measurement highest because it was a well-fed single kid or because one breeder gave it extra feed for the show? Perhaps the animal that would throw the best carcases is actually one in the middle of the pack who was raised as a triplet by a maiden mother?

KIDPLAN will adjust for all these things and more. Unprocessed 'objective measurements' are like the blurb on the book – they are easy, cheap, interesting and marketable, but they are of limited value in assessing the genetic merits of your animals or animals that you buy.

So, to answer the title questions:
Q1: Will KIDPLAN improve your breeding and profitability? A: Yes, unless you and your customer are interested only in the visual aspects of the animal.
Q2: Can you assess the genetic merit of your animals with a smattering of 'objective measurements'? A: Very unlikely and only in a limited and risky way.
Q3: Will using KIDPLAN take time and effort? A: Yes.

To conclude, KIDPLAN is not for every breeder but, if you want to improve the production capabilities of your animals, it's the way to go. And there is no reason why their appearance and structure shouldn't continue to be just as good as it is now.
If you want to find out more, you can access a range of material at the following link:
http://www.sheepgenetics.org.au/Breeding-services/KIDPLAN-Home

or contact Geoff Moore, Crusader Boer Goats on 03 3120012, email: gtmoore@farmside.co.nz

QUIZ QUESTION:

Which of these two bucks below would be the best sire for your breeding objective? Both have run together, never showed and never fed. Both have been classified #7 to #8 on different occasions and have few, if any, visual faults. Both have immaculate and well-known pedigrees. But both have been thoroughly progeny-tested and the progeny they throw are dramatically different. One throws kids with good growth rates and about average reproductive capabilities. The other throws slow-growing kids with poor reproductive capabilities and low kid survival rates but is extraordinarily worm resistant. The choice would significantly change your herd.

BUCK A 

BUCK B 

Article supplied by Geoff Moore.

GENETICS

By Marvin Shurley
for The American Meat Goat Association

Focusing on one trait can be the fastest route to improvement

Second only to dogs in length of time since their domestication, goats have been managed by man for approximately 12,000 years. Since this time, if one figures breeding ages in, goats have been subjected to 4,000 generations of selection by humankind. During this time the desirable traits of certain breeds were developed, meat and milk production possibly were foremost, skins, not textiles, were used as coverings prior to development of weaving techniques.

Overall size, bodyweight, milk production, average daily gain, etc... are quantitative traits as are practically all important economic traits in goats and other livestock. One major problem in selecting for these quantitative traits is that the expression of them in any animal is influenced greatly by environment. In theory if you took a set of cloned animals, as control, being genetically identical, and raised one under optimum conditions, and shortened the others feed, minerals, and vitamins you would produce two very different phenotypes of animals even though the they're the same genotype; actually genetically identical.

You may wonder where this is headed, so here we go. When we as breeders select animals to breed we largely rely only on phenotype or visual appearance. Phenotypes are determined by genotype (genetics) plus environment. Normally the better looking goats are better genetically, but not always. One must keep in mind the environment that they were raised in. This means you might select a very good phenotype as a potential brood animal that is not as good genetically as it looks. This is the reason many times the offspring of really good animals move downward toward the average for the breed while offspring of poor appearing animals often move upward towards the breed average.

It may sound disheartening but through careful selection, improvements can be made, albeit slowly. The breeder's job of selection is made difficult by the fact that each and every set of animals is raised in a different environment due to differences in herd managerial styles.

One circumstance where this is not true however, is in a controlled environment such as a performance test. In such tests all animals are fed the same diet, are penned, handled, and housed the same, and are approximately the same age. In essence environmental concerns are removed and genetic superiority, not managerial superiority (i.e. being the best goat feeder) is determined. This is one reason such tests are of importance to us as breeders as it provides as a chance to pick the best, not just one who looks the best.

The percent heritability of traits varies greatly in any breed. The desired traits and the percentage of their heritability does however affect the EBV or estimated breeding value of the animals we select. EBV can be determined by comparing the animal under consideration to the average for all the rest available for selection. While I've been unable to uncover any hard data regarding goats and trait heritability the following percentages are extrapolated from data on percentage of trait heritability in cattle, sheep, and swine, and are approximations which should be fairly accurate.

Percentage of heritability as follows, twinning 13%, birth weight 35%, weaning weight 28%, yearling weight 40%, average daily gain (ADG) 45%, pasture gain 35%, loin eye area 46%, does maternal ability 40% (I'm currently reviewing this one). These are some important economic traits and as you will notice they are to a degree highly heritable. Conscientious breeders of brood stock should be able to provide data on some (if not all) of these traits to aid you in your selection of breeding animals.

The heritability of a few other traits are as follows: number of nipples 14%, number of functional nipples 24%, neck folds 39%, body folds 37%; these are traits of interest to those conforming to breed standards for Beer goats and are not important to commercial producers.
The EBV on dams as well as sires must be taken into consideration as each parent contributes one half to the offspring.

For those of you who enjoy math and numbers here's a formula for determining EBV of animals for various traits: EBV=Heritability X the difference between the individual under consideration and the group average. For example the top gaining buck at the ASU performance test had an ADG of.95 Ibs. The group average was .48 Ibs. per day and heritability is 45% (.45). Thus we have .45 (.95 -.48) = .45 X.47 = .21 or .21 as this animals EBV for the ADG trait. By example if we had one with .50 ADG, .45 (.50 - .48) = .45X .02 = .009 or .009 as this animals EBV for the trait of ADG. Selection is thus made easier with the application of a little math. All applicable traits may be figured by this method if group averages are available.

Once we have these figures in hand we can work on EPD or expected progeny differences in our herd. Since each parent contributes one half of its genes to its offspring, EPD is one half of EBV or EPD=EBV1/2. Knowing this we can assume that if we mated the first buck with EPD of.105 for ADG and buck #2 with EPD of.0045 for ADG to like does, buck number ones offspring would gain .1005 Ibs per day more or roughly 3 Ibs. per month resulting in 10 more Ibs. of marketable meat at 70 days of age and increasing the producers income by $7 -$10 per head.

Since phenotype differences are so easily influenced by environmental variations the only way to compute accurate EBV is where all environmental concerns have been eliminated such as in performance tested animals.

When we as breeders select a trait to breed for and start to wonder about how we are progressing, or our expected response, we must take into account two variables; one being the heritability of the trait and two being selection differential, defined as "The difference between the average of selected individuals and the average of the group they were selected from".

Selection differential is based on the same concept as estimated breeding value except it is for a group of animals instead of one single animal. When we look at the expected response to selection, what we're really questioning is how much genetic progress we are making in the improvements we seek in regard to any particular trait.

Response to selection is determined by two factors; first is how heritable is the trait and second is the size of the selection differential. Breeders can't change the heritability of a trait. The percent of heritability depends on the traits being selected and the amount of additive genetic variation in the trait. Again the value of performance testing comes to light as it reduces phenotype variation due to known environmental factors. This helps improve the accuracy of selection and, in effect, increases the size of the heritability of a trait in your herd.

As breeders involved in production agriculture we are forced by economic factors to concentrate on the traits which will yield us the most return. Three very important aspects to consider are feed efficiency, reproductive efficiency, and quality of our product.

Focusing on one trait at a time is the fastest route to improvement.
The following table shows what happens when one chooses to try and select for more than one trait at a time:

Number of Traits	Percent Effort Each Trait
1	100%
2	71%
3	58%
4	50%
10	32%

What is to be learned is to carefully choose which traits to focus on first. As you can see efforts are diluted by including too many at once. When we look at how to select animals as herd replacements or herd sires there are four methods to be considered:

1) Individual performance as in performance test results.

2) Pedigree selection.

3) Sibling selection

4) Progeny test.

These methods used in combination with each other will help maximize genetic potential.

Individual performance is most commonly used by us as producer as we quite simply keep the best for our herd replacements. The genetic worth of these animals as parents is based on their EPD. The idea behind this is to obtain an estimate of the performance to be expected from this animal's progeny as compared to others of the breed.

Pedigree selection is also widely used by breeders of pure bred animals. When using this method though one must be careful not to over value the existence of remote ancestors in a pedigree. When one has a son of an exceptional animal (called X), the son has but one-half of his sires (X's) genes; the grandson one-quarter of X's genetics and his offspring not but one-eighth of X's genetics, and we must consider in this case how good are the other seven eighths of the genetics in this animal as dilution of trait heritability occurs rapidly in each successive generation.

Sibling selection is choosing animal such as brothers or sisters with one or more ancestors in common. Again caution is to be exercised as even full brothers do not have but 1/2 of their total genes in common. Explained as follows: each gets a random 1/2 from their sire, thus 1/2 X 1/2 = 1/4, and; random 1/2 from their dam 1/2 X 1/2 = 1/4, and so 1/4 + 1/4 = 1/2 of their genetics in common. This is the genetic reason there can be such variation in appearance in a set of twin or triplet kids. Half sibs have but 1/4 or 1/2 of the above amount of their genes in common resulting is even greater variations. This is why pedigree worship should be avoided.

Progeny testing is the fourth method used and is basically estimating the breeding value of an animal based on its offspring's performance. It is said "individuality tells us what an animal seems to be, its pedigree tells us what it ought to be, but the performance of its progeny tells us what it is". Almost all progeny testing done is on sires as in most instances dams do not produce enough offspring for this method to be effective; an exception would be when an embryo transfer program is used producing numerous offspring from one dam. This type of testing while being a very powerful method for identification and selection of genetically superior individuals has one big drawback that is generation interval. By the time we decide which one is the best; they may well be over age for successful breeding. Storage of semen from individual bucks for future A.I. (artificial insemination) could circumvent this if an animal has at least partially proven his worth as a sire of outstanding offspring from different dams.

The time involved for successful breeding and identification of a herd sire is as follows:

We breed a doe and she kids (5 months), he reaches sexual maturity (8 months) and he is bred to a large group of does (2 months). They begin kidding (5 months). We now are at a minimum of 20 months. The buck kids are weaned, tested for performance, and then data is collected and now approximately 28 or more months have elapsed before we know anything about how well we did with our male offspring, and until the does are bred and kidded out we're still short of data, so let's add 8 more months. Now we have 3 years labour, time, and money involved before we know about the first generation of his offspring and what type of production to expect from them. Let's hope we were right in our selection.

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