Are your eyes deceiving you?

Ruakura unit offers a more foolproof method of picking out the good 'uns

by Gillian Dufty, Te Kauwhata

JUDGING STOCK shrewdly, appraising their potential by eye, is a skill developed through years of practice, even if some people appear to have more of a natural bent for it than others.

But is a good eye infallible? Sue Beaumont, technician in charge of the new artificial breeding unit for deer at Ruakura, has had a lot of experience with AB in sheep — and she says it's rare, if not unheard of, to get a top animal genetically which does not look the part.

Still there must be numbers of animals which appeal to the eye but fail to live up to their promise in performance through their progeny.

Discounting the blow-hards who overestimate their own talents, is it enough to know a good animal when you see it? Are majestic looks, exotic origin, good breeding and a king's ransom sufficient guide to worth — or do you need data comparison of progeny and statistical proof?

Bull of the day proved its worth by lifting breeding standards and levels of production across the dairy industry. Today livestock improvements, BI and PI (breeding and production index) have become magical passwords to higher prices. In the process some farmers seem content to relinquish subjective eye appraisal altogether.

One cannot judge deer farmers by their dairying counterparts, of course.

But technology is knocking on the deer farm gate with a promise on its computer screen. Artificial breeding and sire referencing offer excellence based on statistical evidence — objective proof on a printout — versus subjective judgement or your own slower and limited evaluation through record-keeping.

Sire referencing can identify one out of 100 stags while a farmer is identifying one in 10, says MAF Tech animal breeding consultant Julie McCall.

The deer unit at Ruakura has been established primarily for sire referencing. The NZDFA has contracted MAF Tech to organise the scheme, McCall says.

"It flows on naturally from our work with sheep, and we can see the benefits of running it in conjunction with Animalplan which can be expanded to a multi-species scheme," adds Beaumont.

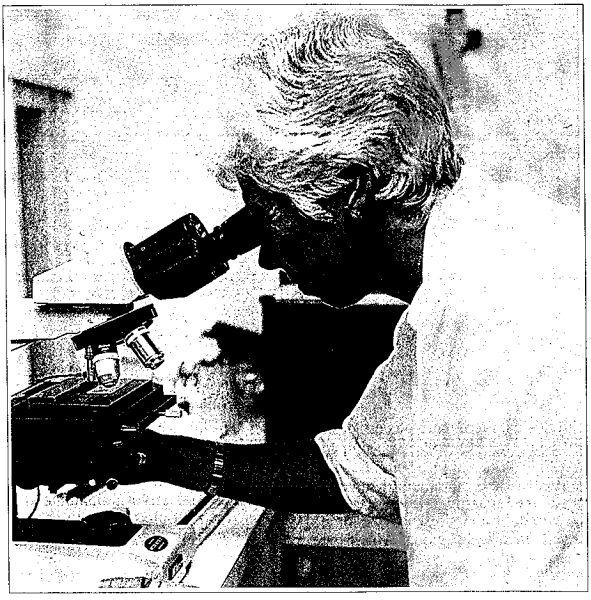
McCall sees the benefits of sire referencing as two-fold. "We get rapid rates of genetic improvement across the industry very quickly, and there is constant improvement. But we have to get the farmers involved."

The more farmers involved the better, of course, since the sires will be proved against a wider range of variables and over greater numbers of hinds.

The principle behind this scheme requires the selection of the top two sires available, preferably progeny-tested stags from performance-recorded herds. Semen from these animals is then purchased by all farmers in the scheme.

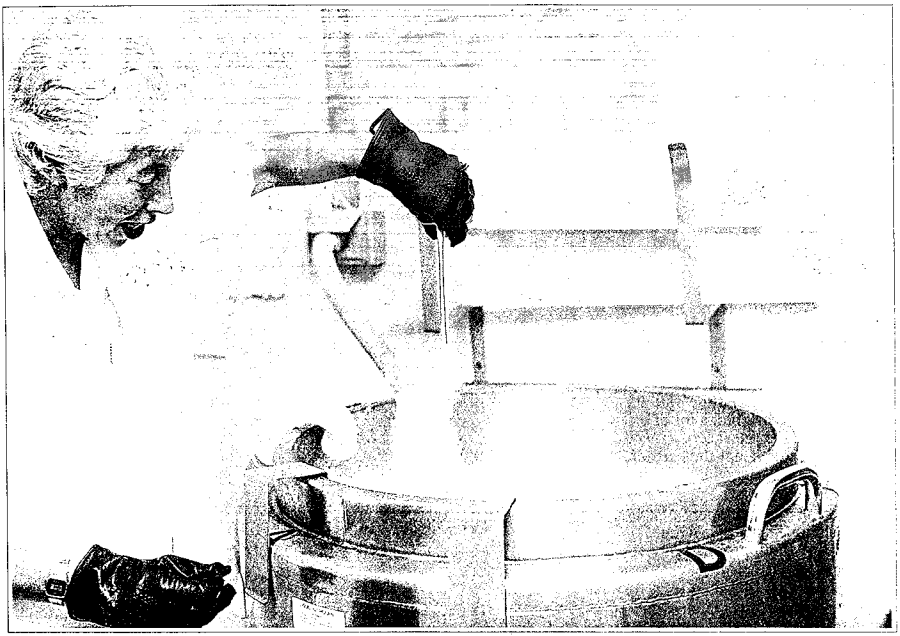
At present this means each farmer receiving 40 straws from two stags — 20 of each.

The success of the scheme demands that all the farmers record full details of their herd, including information about feed supplements and conditions. ▶



Deer semen is checked at Ruakura for its 'vital signs'

Each sample from a stag is inspected under the microscope for sperm concentration and motility



▶ With this data, comparisons are done at Ruakura, taking into account all the variables.

Using two stags rather than one assists the statistical comparisons. The two common sires now become the reference sires against which the records of all other stags can be evaluated.

In most cases the farmers in the scheme will discover their own sires are giving a poorer performance, because the two animals selected are of proven high quality. It will give them a standard against which they can judge the performance of their own stock.

It will often be the means by which an ordinary farmer can have access to high-quality sire stock without having to find the money to buy a superior animal.

But the scheme is still far from cheap, involving as it does the expensive technique of artificial insemination.

Even so, it is by this means that the genetic pool of top-performing and superior animals can be spread across the board to boost the standards of the industry quickly.

It will still take two years before velvet production and liveweights can be assessed. However, during that period the sires will have proved themselves over a greater diversity of females and environmental conditions than could possibly have been the case under normal farming practices.

"This way we get to know the best name sires, identify them, then use them as reference sires, replacing them in turn as records are evaluated," says McCall.

At this time there are seven members of the fledgling scheme, she says — plus links with the properties where the sires are naturally mated.

Stags currently included in the sire reference scheme are from Brian and Ann Managh of Rotorua, John Kerr of Hastings, and Craig Hickson of Hastings who belongs to the Hawkes Bay group breeding scheme.

Having decided that the sire referencing scheme has merit, one is then faced with the need for artificial insemination and semen collection — no simple matter with deer.

No deer farmer needs to be told that a rutting stag is a most dangerous animal. Semen from bulls and rams can be collected by using a teaser female, then the semen harvested by means of an artificial vagina held by an assistant.

Currently the only method of collecting semen from stags is by anaesthetizing them using the drug Rompun, which knocks them out for about 10 minutes. An electric impulse then causes the stag to ejaculate the semen which is collected in a glass cup.

Rompun is quickly degraded in the animal's system by its own enzymes, and the deer is quickly reversed out of the anaesthetic with another drug called Recervyl.

A vet is always present and the procedure can only be used on the same stag once a week. Although Ruakura has not lost a stag there is always a risk associated with administering anaesthetic, McCall agrees.

Not all animals perform well under these conditions and others fail to give good quality semen (though it cannot be established whether this relates only to semen collected under these circumstances, since comparison with natural conditions is impossible), says Beaumont.

It is possible to get urine contamin-

Above: Unloaded straws of deer semen

Each straw contains 50 million sperm — give or take a few

Left: Taking straws of deer semen out of liquid nitrogen storage

The semen can be stored indefinitely without spoiling

ation by this method, but Beaumont says it is rare and usually an operator problem. Such semen has to be discarded.

The science area leader for animal reproduction, Paul Donnelly, says it is too early for a progress report on research being done into a technique for natural collection of semen.

"There are numerous prototypes of artificial vaginas but tests have not yet been done to the proving stage," he says.

Since an external device is out of the question for a stag, a device is likely to be developed for insertion into a pet hind and retrieval later.

Donnelly says a shortage of experienced personnel in the field led Ruakura to bring over an Australian Research Fellow, Dr Henry Jabbour.

Ruakura is also working on semen characteristics and quality, which are good diluents for storage and the insemination procedure itself.

Also necessary is information on when artificial insemination should occur. "We need to know when ovulation occurs (when the egg is released from the ovary) in relation to when the doe shows oestrus. These are primary objectives," Donnelly says.

In common with ewes, hinds can only be inseminated intra-uterine. They must be tranquillised before a small incision is made in their abdomen, through which a laproscope is inserted (to see with) and a pistollete containing semen inserted into the uterus.

Once the semen has been collected from the stag, it has to be processed.

Beaumont first tests the sample for concentration and motility of sperm, and if neither come up to scratch then the sample is discarded. Motility — the active quality of the sperm — is of prime importance for the best chances of conception.

The test is done by putting a drop of semen on to a warm slide and inspecting it under a microscope. The semen must not be subjected to sudden changes of temperature or polluted with water which will kill the sperm.

Next it is poured into a glass cylinder in a water bath at 37 deg C, the blood temperature of the hind.

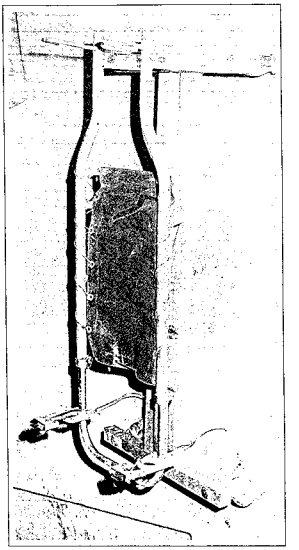
Diluent is also stored in this bath and it is added to the semen in quantities which relate to the concentration of sperm it contains. Each raw ejaculate has a different concentration of sperm motility. The aim is to standardise the number of sperm per straw at 50 million — that is, per .25 ml.

The diluent is a neutral extender and a compatible medium containing sufficient nutrient to sustain the sperm without overstimulating them, plus glycerol to prevent the formation of ice crystals.

The glass cylinder is then placed in a refrigerated cabinet set at a constant 4 deg C where it remains for four hours. It is then loaded into straws manually, using a nozzle attached to a vacuum pump. They are sealed with a PVC powder and then stacked on steel racks and plunged into a programmable freezer which snap-freezes them to -75 deg C. It then gradually reduces them to a temperature compatible with the liquid nitrogen in which they will be stored permanently.

Being inert, the semen can be stored indefinitely without spoiling.

All animals must be health-tested and held in isolation. The herds from which they come must be accredited free of Tb and all other diseases.



A cradle for collecting semen from anaesthetised stags

A dose of Rompun, an electric impulse and it's all over

The new deer unit also undertakes custom collection of semen, a commercial enterprise whereby a farmer may arrange for semen to be collected from a chosen stag.

Within the sire referencing scheme, too, a farmer may decide whether semen from his stags is to be available commercially and/or for sire referencing.

All the costs have to be borne by the farmer members of the scheme. The service is available to those outside the scheme but at an extra cost. Royalty is paid on the straws.

It's uncertain to what extent Ruakura will run a commercial venture. According to Beaumont, they were the logical people to start the scheme and follow up the research: They have the personnel, the equipment and the experience.

Under the current user-pays philosophy, they must also try to at least recoup their costs. At present she cannot envisage Ruakura getting highly involved in the marketing of semen commercially, but who knows? □