

New super drug

ARE BORN TO THE JOB

An Australian Customs Service 'bold venture' to breed special drug detector dogs has exceeded all expectations. JOHN VANDELOO tells how a new line of 'supersniffers' are able to do a better job at less cost – and how the research that produced them could help studies into human disorders.



Why do we now breed detector dogs instead of searching for suitable types and buying them? To get rid of the weak link in the chain - continual frustration brought about by the generally poor quality of recruits.

We had to do something to pick up quality recruits in sufficient numbers to ensure the detector dog program could continue and then focus on increasing productivity across the board.

Many people thought that breeding them was an obvious solution. In the early 1990s that was not so clear. Other agencies, particularly United States Customs, had tried and failed. The Americans decided it was more productive to acquire dogs from traditional sources, such as pounds or private donations.

We do not have the vast dog resources of cities like Chicago and Los Angeles, where pounds can have 400 or 500 dogs. I was spending all day driving around to look at 20 or so. With the success rate about one in 1000 dogs, to get one which was suitable was frustrating, labour intensive and costly. And when we finally selected a dog there were always nagging fears. What is its background? Does it have a genetic time bomb ticking away?

John Vandelloo and Kath Champness with some of the results of their work.

detector dogs

Often the dogs' working lives would be cut short because of genetic disorders. A dog could be put through 12 weeks of intensive and costly training at the National Training Centre in Canberra only to see that investment lost.

In many cases breakdowns were caused by physical problems. Younger dogs could cope with the rigours of training, but in a year or two weaknesses would emerge. It could be a hip or elbow problem or progressive retinal atrophy, a genetic disorder of the retina which leads to blindness.

During the late 1980s and 1990s, Customs procured surplus dogs through the Royal Guide Dogs Association breeding program. Although fewer than five per cent showed traits suitable for detection work, we found common grounds when we researched their blood lines. There were litter mates, cousins and half-brothers we could use to research blood lines and identify breeding stock throwing these traits.

The Royal Guide Dogs program was not selecting for the traits we wanted. Dogs with these traits could be called the "bad apples" in the Guide Dogs barrel. But they looked to be right for Customs.

My background in livestock gave me confidence that, by taking a calculated risk, Customs could establish a successful breeding program.

In early 1992 George Riley, then Chief Instructor with the Dog Unit, and I visited New Zealand to procure dogs and study alternative breeding programs with the Royal New Zealand Guide Dogs and the New Zealand Police. Most programs were multi-purpose and produced pups for police protection work with some suitable as bomb or drug detector dogs. These programs were not specific enough. Customs needed to breed what has become known as a 'supersniffer'.

It was decided to approach Dr Rolf Bielhartz of the University of Melbourne's Department of Agriculture and Resource Management to discuss an academic project which would use genetic analysis to establish whether, or to what degree, traits important to Customs are inherited.

In 1993, a partnership was formed with the Royal Guide Dogs Association and the University of Melbourne, and Kath Champness was selected to conduct doctoral research under Doctor Beilharz' supervision.

The post-research success rates and graduation rates exceeded our expectations. I had hoped that at best one in three of the dogs we bred would be successful as detector dogs. The figure is now closer to one in two. In addition, some of our surplus dogs now work with the military and the police as explosive detector dogs.

We started a new program requiring resources at a time when Customs was contracting. But the Breeding Centre needed to grow. Given the fact that we were rowing against the tide, we were vastly pleased that we managed to achieve such great outcomes in a very cost-effective way.

Procurement costs have been slashed compared with the former methods, when we looked for dogs in homes and pounds, even though the dogs were purchased cheaply. Then, just procurement cost for each operational dog on an eight-year cycle was more than \$24,000. With the success rates we are achieving, that cost has been slashed to around \$5000.

We renamed the Breeding Centre the Breeding and Development Centre for good reason. Our function does not end when the puppies are born. We develop those puppies by applying what we have learned from our research. It is not just a matter of 'having the right

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What makes a supersniffer?

Essential characteristics include:

A confident attitude in familiar or unfamiliar environments.

A determined and untiring desire to retrieve.

A possessive attitude towards retrieved objects.

Active alert dogs work with air and sea cargo, airline baggage and mail. They are trained to scratch and bite at the location of hidden drugs. Passive alert dogs are used to detect drugs on people and to sit quietly in front of a suspect.

A key part of the breeding program is the Puppy Walking Scheme. Foster families care for a puppy for up to a year. Customs officers visit once a month to carry out prescribed games and exercises to develop hunt and retrieve drives.

For the research carried out with the University of Melbourne, one third of each litter was raised in a kennel environment with games and exercises, one third raised with foster families as normal dogs, and one third with families under the Puppy Walking Scheme.

More than 50 per cent of the Puppy Walking 'graduates' were suitable for further training compared with less than 10 per cent for each of the other two groups.

Training takes 12 weeks and the dogs learn to detect the odours of heroin, cocaine and cannabis products. They are encouraged to retrieve an article having a drug odour in challenging situations and when successful are rewarded with a tugging game and lots of praise. They are never fed, dosed or in any way rewarded with drugs.

genetic combination. We also have to apply the right environmental conditions for the 12 to 14 months from birth to training age.

We have to develop their hunt drives and temperaments. As very young puppies they are exposed to human imprinting to build their abilities to cope with different work environments. Exposing them early to minor stresses and exercises can change their body chemistry so that they produce about three times more neo-adrenalins than a puppy that is not given those experiences. That extra adrenaline, later in life, will help them to sustain their attention despite a "circus of distractions".

Amy Davis Mozdy, a Fulbright Scholar at the Walter and Eliza Hall Institute in Melbourne, used that expression in an article on the breeding program published in *New Scientist* (10 May 1997). She suggested that the unswerving concentration engendered in the puppies during early training may assist scientists to address problems associated with Attention Deficit Disorder in humans. Her article and the interest shown by the scientific community in the United Kingdom and the United States has propelled our research onto the world stage.

Customs has developed something very special. Something that as a good global citizen we may well contemplate sharing with others. There are many countries who are experiencing the same problems because of inadequate supplies of dogs that we had experienced two or three years ago. Many countries do not have drug detector dogs because they cannot secure enough suitable candidates.

Is it feasible to establish a global gene bank for detector dogs where Customs could assist other countries to develop a major gene pool, an offshoot of this unique gene pool we hold in Australia?

United States agencies are under pressure to triple the number of operational detector dogs to increase global security. Australia's program could assist them to achieve their aims and at the same time protect the quality of our breeding stock.

Every time an out-cross from a non-selective breeding program is introduced it reduces our success rate until such time as we can build it up again. If there were three or more similar quality colonies around the world, we could then swap genetic material without taking a backward step along the way.

To produce that outcome the Australian Customs Service would need to enter into a partnership with a country prepared, like us, to finance a creditable program.

It is a challenge which needs to be addressed to shore up the gains we have made.

John Vandelloo is Manager of Customs Breeding and Development Centre in Melbourne.

RESEARCH THAT FOUND THE TOP DETECTOR DOG TRAITS

The Australian Customs Service and the Royal Guide Dogs Association of Australia funded a special postgraduate studentship to support a principal researcher for three years to study development of a breeding program for drug detector dogs.

Assistance also came from the Australian Association of Animal Genetics and Breeding, the Australian Society of the Study of Animal Behaviour and the University of Melbourne's Department of Agriculture.

Dr Kath Champness earned a doctorate for her work on ways of identifying the traits that made the best supersniffers.

Behavioural studies were conducted on the Royal Guide Dogs population of Labradors and Customs established a trial breeding population. Dr Champness said that traits important for success as a detector dog were defined and a chase-retrieve-hunt aptitude test designed to measure them. Some sex differences for individual traits within the combined dogs populations were found but no sex difference was observed in terms of overall performance. Dogs selected to start a detector dog training course performed significantly better on the aptitude test than dogs not selected to start a course.

Puppies raised in Puppy Walking homes performed significantly better than those raised under kennel conditions. Juvenile puppies exposed to games based on those used in detector dog training performed signifi-

cantly better in the aptitude test than a control group. Puppies exposed to these games were more likely to be selected for training.

Aptitude tests for six-week old puppies showed no correlation between performance at that age and performance at maturity. However adult performance could be predicted to some degree from three months onwards. Accuracy of the prediction improved with age. Good performance in the chase-retrieve-hunt test correlated favourably with excitability and unfavourably with traits of fear.

Results indicated that a reliable and high quality supply of detector dogs can be produced by establishing a selective breeding program and providing a suitable rearing environment. Dr Champness recommended that:

'Maiden' breeding stock should be selected only from animals successful as detector dogs.

A further selection to 'proven' status should be made based on the performance of their progeny.

Puppies should be raised in Puppy Walking homes. From three weeks until maturity they should be widely socialised and given regular and controlled exposure to games based on those used in the Detector Dog Training Program.

Assessments for potential ability as a detector dog should be undertaken at three and six months at which poor performers could be removed from the program.

Since completing the research project, Dr Champness has taken up the position of Breeding Manager for the Royal Guide Dogs Association.



ABC Science Show presenter Robyn Williams interviews John Vandelloo and Kath Champness.