



To: Productivity Commission on Intellectual Property

Date: 3 June 2016

I would like to make brief comment about IP in relation to the patenting of genes and methods of using genetic information.

Genetic improvement of livestock (including cattle, sheep, pigs, fish and a range of other species such as honeybees) and plants (including forest trees, cereals, pastures and horticultural crops) is economically vital to Australia. This is for reason both of simply meeting the cost-price squeeze, but also for actually growing real wealth and helping industries tackle challenges of production efficiency, product quality, sustainability and welfare.

Genetic improvement consists in using various clues – information on pedigree relationships, individuals' performance, and on their genes – to estimate which animals or plants have the best genetic make-up for some specified purpose, and the using those individuals preferentially as parents for the next generation. Repeating this process year after year or generation after generation leads to steady improvement in the genetic makeup of the population – genetic improvement.

Australia has a strong track record of contributing to the development of knowledge and methods in genetic improvement, and in leadership in practical implementation of genetic improvement in all our farmed species.

This track record has depended on a combination of domestic expertise, know-how and research and on-farm hard and expensive work, coupled with a two-way flow of ideas, expertise, know-how and genetic material with the rest of the world.

Up until the early 2000s, the methods and implementation of genetic improvement consisted of use of knowledge of pedigrees coupled with records of animals' and plants' performance, but long before this time, scientists in this country and overseas had developed the theoretical understanding of how to make use of information about specific genes or regions of the genome.

In the 1990s and beyond, methods have become available whereby we can read the DNA makeup, or genetic makeup of individuals. Provided that we have access to large volumes of data on the performance of those individuals or others closely related to them, we can then use the statistical association between the genetic makeup, usually across thousands of DNA locations, and recorded performance, as a basis of predicting the merit of other individuals from the same population for which we only have their DNA makeup (their genotype).

These approaches have been incorporated into genetic improvement in most species in the developed world, certainly in livestock and increasingly in plants, and are being used increasingly in the developing world as well. Because of the extremely heavy demand for performance information which is essential to developing the statistical association between genotype and performance, there is increasing collaboration across countries in both R&D and implementation in this work.

The key point to note is that the basic idea of a statistical association between genotype and performance, and using that as a basis of estimating individuals' genetic makeup, has been public domain and indeed the basis of all teaching, research and practice, for decades.

The Issue:

Soon after when the methods for reading DNA were first developed, some patents were submitted in several countries around the general idea of reading DNA at some unspecified level of precision, associating that with performance, and using the association as a basis for estimating individuals' genetic merit. This despite this being a fundamental principle of all genetics since the science began in the early 1900s.

At risk of appearing flippant, the patent claims are logically and functionally equivalent to someone claiming rights on all mineral bodies ever discovered in Australia, based solely on having a map that includes no more than the coastline, with the substantial point of the claim being the statement of the novel idea that somewhere on the map there will be locations discovered that contain ore bodies. And further, completely ignoring the fact that all the work to locate the ore bodies, build infrastructure for extraction and transport of any mineral ores, process them etc, will have to be done by someone other than the patent proposer.

This area of IP is not well dealt with today in Australia:

- Patent applications that are completely inappropriately broad are accepted and treated as serious
- The approval process has no obvious mechanism for accounting for the fact that the ideas have existed in the public domain for decades, that the industries in this country will have to do all the expensive work to implement the genetic improvement programs that include use of DNA reading
- The consideration of the patents appears not to take into consideration the considerable international exchange of knowledge, know-how and genotypes and performance records that a) help us implement in Australia and b) contribute to ensuring that Australia continues to be a leading R&D contributor to this field internationally.

Underpinning these issues is the deeper one of whether DNA, locations within DNA, and/or obvious methods of using DNA information, are appropriate for patenting in the first place.

Overall, it is hard not to conclude that within the IP system, methods and procedures that are completely inappropriate to the field are being applied; and further, that the IP office is so overwhelmed with work that they do not have the time to assess strategically and operationally that these gene and gene methods patent applications are not appropriate for any degree of approval.

This is not in the interests of the Australian community or our relations with other countries.

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