



Research in QTL Analysis

Analyses

Searching for QTL within a purebred line of swine

A collaborative QTL mapping project involving AGBU, the Department of Animal Science at the University of Sydney, and Bunge Meat Industries, has been carried out on mostly purebred, commercial pigs in Australia. A half-sib design was used in which two Landrace and two Large White boars were each mated to a random selection of dams to produce on average 100 progeny.

Phenotypic data were collected on 18 production, carcass and meat quality traits in test station facilities at Bunge Meat Industries. A variety of interval mapping procedures were used ([link to QTL mapping page](#)). QTL have been detected for many marker-trait-family combinations. A new collaborative project is currently verifying a selection of these QTL using an independent resource.

Screening lamb, cattle and swine for possible QTL

AGBU has a number of ongoing projects screening populations for a number of traits. These include carcass and fertility traits in cattle, sheep and swine populations. Possible QTL have been found for fatness in all three populations and for parasite resistance in sheep and cattle.

Searching for QTL for parasitic resistance in sheep and cattle

The Golden Ram

In 1980 an experimental population was established to investigate the genetic basis of resistance to the Barber's Pole worm (*Haemonchus contortus*). The progeny of one ram, now called "Goldie", were found to have exceptional resistance. A series of crosses were made to identify the cause of the resistance but the results were inconclusive. The population, and a control line, unrelated to 'Goldie', have been maintained and

recorded until recently. Analysis with 'The Gene Detective' found a possible QTL that caused about half the variation in resistance. It also revealed that 'Goldie' was homozygous for a QTL, but that other individuals in the population (including the control line) were also heterozygous for this QTL. The assumption that Goldie was the only individual carrying the desirable allele had clouded the interpretation of the results of earlier experiments. When re-analysed with 'The Gene Detective' under this assumption no QTL was found. A number of other analyses using data simulated on the same structure (pedigree and fixed effects) were completed to find if other genetic effects, such as a very different polygenic effect of 'Goldie', would be detected as a QTL. In no case did this happen.

A project is being established to identify the cause of 'Goldie's' resistance.

The CRC for Meat Quality

As part of AGBU's contribution to this CRC we analysed some data, spanning 1982-1993, from CSIRO's Belmont Red cattle to search for QTL for tick and worm resistance. 'The Gene Detective' found evidence to support a QTL for each trait. The QTL for one trait did not affect the other trait. Fortunately, semen on all sires used to generate these cattle is still available. It is likely that some of them will be genotyped soon.