1.5 Qualitative traits, Mendelian genetics

Qualitative traits are characterized by segregation in the classical Mendelian ratios. An example of this is the coat colour gene in the Labrador Retriever which can occur either as black or as yellow. The yellow colour is recessive and the black is dominant. When a gene for yellow coat colour is mentioned it points at both a locus and an allele.
One can also talk about an Albumin locus, even the phenotypes cannot be seen directly. But as will be shown in the polymorphism in the locus can be assigned by means of electrophoreses of serum samples separating the two albumin alleles. The word 'gene' should not be used for DNA polymorphism with more alleles in non-coding sequence. Instead it should be called a locus with more alleles. There is not always a sharp separation between gene and locus or between gene and allele in practice, therefore when gene frequency is mentioned in the it will mean both proper genes as well as alleles in non-coding DNA sequences (loci).

Figure 1.8 shows segregation of genetic polymorphism in a swine family. The polymorphism is in a mikrosatellite, 'S0002' locus, which has a (GT) repeat. It is detected by means of PCR followed by electroforeses of the product to separate the alleles. Most of the individuals have two bands, heterozygotes. Some individuals have only one band, homozygotes. The PCR analyses is carried out by Merete Fredholm.

The boar Cup carries the alleles 209 and 195 and sow 400 carries the allele 199 and 195. Cup is both sire and grand sire of the litter. The dam of the litter number 401 has got the '195' allele from Cup and '199'

Figure 1.8 Segregation of genetic variation (mikrosatellite) in a locus in a swine family detected by gel electrophorese of a PCR product. The boar Cup carries the alleles 209 and 195 and sow 400 carries the alleles 199 and 195 segregating in the offspring.