Methods Features Proteins Seed storage proteins, structural proteins and isozymes. They provide very cost effective markers. Their number may be limiting and expression is not neutral RFLP Requires hybridization of probe DNA with sampled plant DNA. Provides high quality data but has a severely restricted throughput potential Random amplified polymorphic DNA RAPD Based on polymerase chain reaction (PCR). This technique uses arbitrary primers for initiating amplification of random pieces of the sampled plant DNA. This technique requires no knowledge of the genome to be screened, but is inconsistent between populations and laboratories SSR Provides high quality, and consistent results, but the markers are expensive to develop as they require extensive sequence data from the species of interest AFLP The sample DNA is enzymatically cut up into small fragments (as with RFLP analysis), but only a fraction of fragments are studied following selective PCR amplification. Although this assay provides a great quantity of marker information, it is not well suited to high throughput marker assisted selection EST The development of EST markers is dependent on extensive sequence data on regions of the genome which are expressed. An expressed EST is a small part of the active part of the gene made from cDNA, which can be used to fish out the rest of the gene out of the chromosome, by matching base pairs with the part of the gene. The ESTs can be radioactively leveled in order to locate it in a large segment of the DNA SNP The vast majority of differences between individuals are point mutations due to single nucleotide polymorphisms. As such, there are a vast number of potential SNP markers in all species. Considerable amounts of sequence data are required to develop SNP markers. However, their great advantage lies in the potential to screen them using methods which do not involve electrophoresis, such as microarrays.

Table 3 Major classes of markers used for indirect selection in plant breeding (Sharma et al., 2002)