

**Making more miracles: Exploiting marker-assisted methods for pearl millet improvement**

**Project summary**

The current proposal is a logical extension of previous DFID/PSP-funded research to develop and apply marker-assisted selection techniques for pearl millet so that breeding programs for this crop globally can more effectively address the needs pearl millet producers and consumers in the semi-arid and arid production systems of sub-Saharan Africa and South Asia. The project will complete marker-assisted backcross transfer of downy mildew resistance QTLs and segments controlling genes of unknown function to the genomes of 843B and 841B, which are seed parent maintainer lines for many popular pearl millet hybrids in India. It will then evaluate the product introgression lines in inbred and hybrid form to identify QTLs for many yield potential, abiotic stress tolerance, biotic stress resistance, and product quality traits. It will also complete mapping downy mildew resistance QTLs in two recently developed mapping populations, and complete marker-assisted backcross transfer to elite hybrid parental lines of a number of putative QTLs for downy mildew resistance, terminal drought tolerance, and biomass yield, and then assess the product introgression lines in inbred and hybrid form. Finally, it will use field trials in Nigeria to assess opportunities for mapping QTLs for superior ability to acquire phosphorus from insoluble forms present in the soil, using existing pearl millet mapping populations and association mapping techniques in adapted improved OPVs.