New Tools for Pearl Millet Improvement - Defeating Downy Mildew

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The Problem

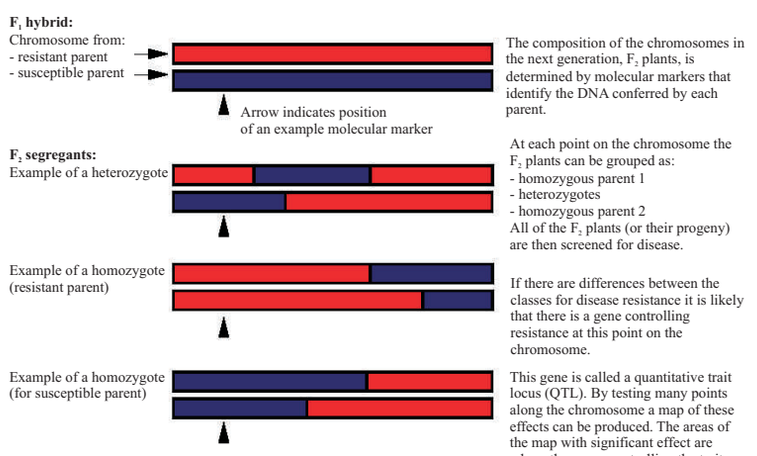
Pearl millet is the cereal crop of choice for people living in the worlds's hottest, driest agricultural production areas. Most pearl millet producers have no alternative, they grow pearl millet or they grow no cereal crop at all. Downy mildew (caused by *Sclerospora graminicola*) is the most devastating disease of pearl millet. Grain is replaced with leaf-like structures/leafy tendrils (see figure right). Farmers may lose as much as 80% of their staple food crop.

Resistance genes offer the only economically viable technology to minimize losses to downy mildew. Since 1990 the **DFID *Plant Science Research Programme*** has been funding collaborative research to bring modern molecular plant breeding to bear on this problem.

The Solution

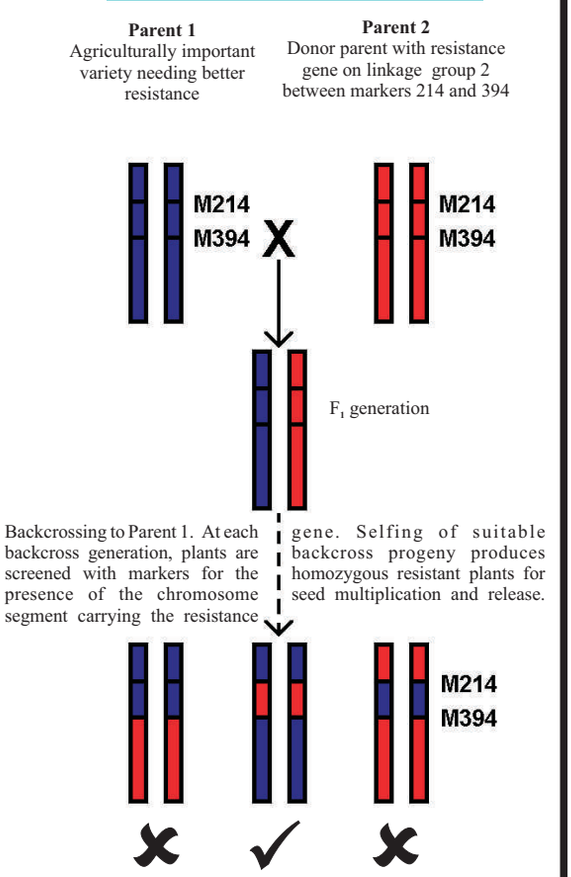
DNA markers provide a tool to speed up breeding for resistance, for extending the useful lifespan of existing adapted, disease-resistant varieties, and for incorporating multiple resistance genes (gene pyramiding).

How Molecular Markers are Used to Find where Genes that Control a Trait such as Downy Mildew Resistance are Located



After the position of the resistance gene(s) has been located, the gene can be introduced into varieties needing improved resistance using marker-assisted selection (see box right).

Marker-assisted Selection



Products

Varieties with improved levels and stability of disease resistance.

Outcomes

Enhanced food security and improved livelihoods for the world's poorest farm families, via the reduced genetic vulnerability of their staple crop.

For further information e-mail DFID.PSP@bangor.ac.uk or visit the Plant Sciences Research Programme web site on http://www.dfid-psp.org or visit the MilletGenes database on http://jic-bioinfo.bbsrc.ac.uk/cereals/millet.html