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EDITORIAL

Improving water use efficiencyP.J. Lea¹ & M.A.J. Parry²

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The availability of water is a major determinant of crop yield worldwide. Agricultural yields are projected to fall as a result of the impact of global climate change on agricultural production as a consequence of increasing temperatures and lower, more erratic rainfall (Parry *et al.*, 2005). The recent imbalance in supply and demand has led to large increases in the price of the three most important staple crops (rice, wheat and maize). The issues of food security and increasing agricultural production are now key priorities, and the need to breed new crops with improved yield (Reynolds *et al.*, 2005; Foulkes *et al.*, 2007; Parry *et al.*, 2007), improved nutrient (Lea & Azevedo, 2006; Hirel *et al.*, 2007) and water use efficiency (Parry & Reynolds, 2007) is widely recognised. Although there is genetic variability for all these traits, each is multigenic, the function of a series of component traits, which makes them difficult to breed for. The explosion of genomic sequence information and the availability of biotechnological tools provide the possibility to relate sequence information with trait (Morot-Gaudry *et al.*, 2007; Talamè *et al.*, 2008). However, the exploitation of genomic data is still a major challenge because of the complexity of agronomic performance (White *et al.*, 2004; Vij & Tyagi, 2007). Nevertheless, molecular plant biotechnology has the potential to deliver high and stable yields. Once key genes are identified, they can be combined through gene pyramiding (Meiyalaghan *et al.*, 2006) to improve crop performance. In addition, the potential of new germplasm will only be realised if agronomists and farmers not only adopt the new genotypes but also the latest developments in agronomic practice (Cantero-Martinez *et al.*, 2007; Kirda *et al.*, 2007; Saeed *et al.*, 2008).

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