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Twice the rice for the same price

DEVELOPING rice crops able to produce more grain with less resources will be a huge step towards solving the global food security crisis.

As part of an international research consortium addressing the crisis, CSIRO scientists are developing genetically modified rice plants by altering the photosynthetic mechanisms of rice to increase yield and reduce water and fertiliser use.

CSIRO scientist, Dr Bob Furbank, in close collaboration with Dr Susanne von Caemmerer of the Australian National University and a consortium of international research partners, will use the high-tech robotic, imaging and computing facilities of the High Resolution Plant Phenomics Centre to quickly screen rice varieties and identify the germplasm and genes needed to improve photosynthesis in rice.

Cereal yields are becoming limited by the capacity for the plant to fix sufficient carbon through photosynthesis during its lifecycle and translate this carbon into harvestable grain.

This stagnation of annual gains in yield from cereal breeding programs is a major factor in the current food crisis.

The CSIRO is part of a global team working to boost rice yields to help overcome a world food security crisis.

Most cereal crops, such as rice and wheat, convert solar energy into carbohydrates using a photosynthetic process called C3.

Crops like maize and sugarcane use a more advanced type of photosynthesis, known as C4.

This mechanism, discovered by CSIRO, allows C4 plants to produce carbohydrates more than twice as efficiently as rice or wheat, using less water and about half as much nitrogen.

The challenge is to make C3 crops more like C4 plants which combine a more efficient photosynthetic mechanism with a cellular structure that enables them to accumulate carbon more readily.

Many genes may need to be introduced into rice to make it C4-like but how many is not yet known.

This is a difficult, long-term project expected to take more than 10 years.

The consortium is co-ordinated by the International Rice Research Institute and funded by the Bill and Melinda Gates Foundation.

■ For more information visit www.csiro.au/science/C4-rice-consortium.html

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