Cooperative Research Centre for Sustainable Rice Production

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Media Release

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Sex life of rice affected by cold

Studying the sex life of rice plants has led to an important breakthrough in the development of cold tolerant rice in Australia, which could bring relief to Australia's rice farmers.

Cold temperatures devastate Australia's rice crops, causing up to $20 million worth of damage each year. This year was a particularly bad year, with some growers losing up to 90% of their crop.

Outcomes from research by Sandra Oliver, a PhD student at CSIRO Plant Industry in Canberra and the CRC for Sustainable Rice Production, could mean that Australian rice growers will no longer have to brace themselves each year for a cold snap.

Cold weather damages the sexual reproduction of the rice plants, causing them to become sterile. This is a big problem for the rice industry, both in Australia and internationally, as sterile plants don't produce grain.

Sandra and her team are investigating the sex life of rice plants, to find out why Australian rice varieties become sterile during periods of cold weather.

Rice CRC research has confirmed that the male reproductive organs in rice, which produce pollen, become "stressed-out" in cold weather, resulting in the plants not making pollen properly and becoming sterile.

"Until now, no-one has known why this occurs and our research has now provided some important clues to help solve this puzzle", said Ms Oliver.

Results from Sandra's research suggest that sterility is a hormonal reaction to the cold. It has been found that stressed-out rice plants produce a hormone in their male reproductive organs very quickly after being exposed to cold. According to Ms Oliver it's similar to having an "adrenalin-rush" when the plants get stressed-out.

Researchers have also found that cold temperatures disrupt sugar metabolism in rice flowers, which results in the pollen dying because it doesn't receive enough energy."

Ms Oliver's PhD project is focusing on identifying the genes that are responsible for causing the changes in sugar metabolism that occur during cold-induced sterility.

This important research could revolutionize the Australian (and international) rice industry through the development of cold tolerant rice, allowing for selection of cold tolerant varieties in rice breeding programs.

The possible economic and environmental implications are huge. Growing cold tolerant rice will boost yields and will also significantly reduce the amount of water used to grow the crop, as water is the element used to protect the plant from the cold.

This and other related research is vital to continue Australia's reputation as the most efficient rice producer in the world.

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