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Australian researchers discover yield enhancing multiovary barley gene mutants

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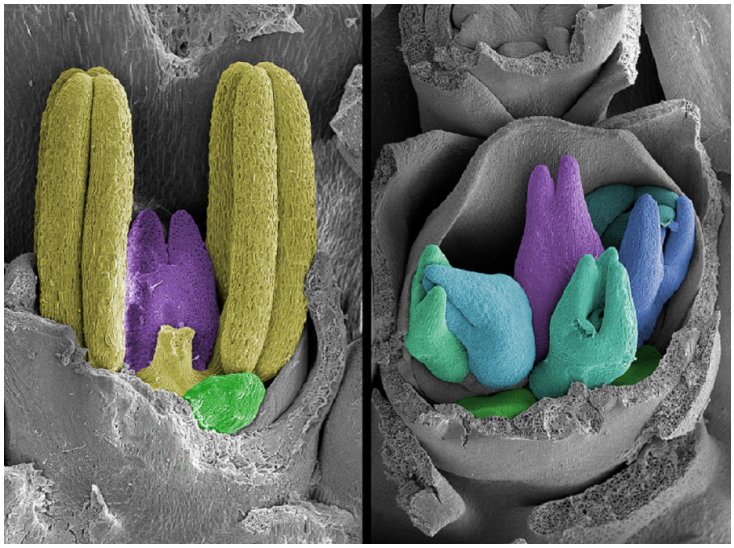

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Researchers at Australiaâ??s University of Adelaideâ??s Waite Research Institute have for the first time identified several genes in barley that could eventually lead to larger yielding crops.

Research team employed genetic techniques and molecular biology to examine several historical multi ovary barley mutants. The discovery may lead to the identification of genes that boost fertility and enhance cross-pollination. It could pave the way for enhanced food security and a more sustainable agricultural future

â??Although the mutant varieties appeared to be quite similar when grown in the glasshouse, we found one type was more fertile than the others and was capable of producing up to three times the number of seeds than the other plants. The genes in that mutant variety of barley could hold the key to increasing the yield of cereal cropsâ? said lead researcher Dr Caterina Selva, School of Agriculture, Food and Wine at University of Adelaide.

The multiovary barley mutants have remarkable features compared to typical Australian barley varieties, producing extra female reproductive organs in each single flower. They were discovered in the 1980s, but this is the first time that the genes responsible for increasing fertility have been identified.

Dr Selva believes these sequences obtained from the mutant varieties could be used to modify the flower structure of conventional barley, making it more receptive to hybrid breeding.

â??By mixing the mutant with other varieties of barley, we can create stronger, more resilient crops that produce higher yields in even the most challenging of environments,â?• she said.

â??This breeding process, known as hybrid vigour, is already used successfully in maize and rice. We can overcome barriers to cross pollination by using the more fertile, mutated plants to produce stronger barley and more of it" explained Associate Professor Matthew Tucker, School of Agriculture, Food and Wine, University of Adelaide.

â??Wheat and barley flowers are structured in a way that makes cross-pollination difficult. This research is an example of how changing one gene can have a positive effect on grain yields. We can overcome barriers to cross pollination by using the more fertile, mutated plants to produce stronger barley and more of it,â?• said Professor Matthew Tucker.

â??This is even more important in the face of rapid urbanisation, volatile international markets, and extreme weather conditions, which are making growing barley more challenging,â?• he added.

Australia produces just over nine million tonnes of barley each year, the majority of which is exported to Asia. It is one of the nationâ??s most widely grown crops and covers around four million hectares of land from southern Queensland through to Western Australia.The research was published in the *Journal of Experimental Botany* and could be used to help improve the agricultural industry both nationally and on a global scale.