



More wheat, less water

China and Australia can dramatically boost wheat yields and improve food security by unlocking the genetic potential within the hundreds of wheat varieties grown in the two countries. That's the promise of the latest collaboration between wheat researchers in the two countries.

Chinese farmers have been growing wheat for at least 4,000 years. Crop yields per hectare are now nearly 10 times higher than in 1960 and China is now the largest wheat producer in the world. But wheat researchers say we can do more.

"In China, wheat is grown in dryland areas such as Inner Mongolia, Hebei, and Gansu. Growing conditions are similar to Western Australia," says Professor Jacqueline Batley from The University of Western Australia (UWA).

"When the conditions are good, yields are high. But in times of high temperature and low rainfall, crops can fail. Working together, we can create drought tolerant crops with higher yield," she says.

Professor Batley is part of a new project that builds on decades of agricultural collaboration between China and Australia including:

- Contributing to the global effort to decode the wheat genome.
- Helping Chinese farmers make better use of water through mulching and tillage in a project between UWA and Lanzhou University
- Producing better tasting and higher quality bread using new genome data for wheat grown in Australia (Murdoch University and the Chinese Academy of Agricultural Sciences)

"For this new project we are analysing 1,500 strains of wheat, from China and Australia," says Professor Batley. "It's exciting to work with our colleagues at the Inner Mongolia Academy of Agricultural and Animal Husbandry Sciences, the Gansu Academy of Agricultural Sciences, and the Hebei Academy of Agricultural and Forestry Sciences. They bring vast experience in field work and crop trials and their laboratories are surrounded by fields to trial new wheat strains."

The Australian team's skills include genomics expertise and new breeding technologies that enable eight generations of crop per year.

"We're finding that there's a lot of untapped diversity in wheat. I think we'll keep increasing the yields for decades to come," says Professor Batley.

"Exchanging wheat strains between Australian and China is the key to success," says Professor Guijun Yan from UWA. "With improved breeding lines, we will not only meet the priorities of Australian and Chinese wheat breeding programs, but also contribute to the world demand for food security and sustainability," he says.

The other project partners include InterGrain Pty Ltd; Chinese Academy of Sciences; Chinese Academy of Agricultural Sciences; and Beijing Genomics Institute. The work is supported by the Australian government's Global Innovation Linkage program.



Also...

South Australian seaweed is being harvested by a Chinese company Gather Great Ocean Group. They're after the marine sugars from native Australian seaweed species, for use in high value products like cakes, jelly and pharmaceuticals. The project was initiated by Flinders University researcher Professor Wei Zhang.

The fruit of the jujube tree is a traditional Chinese food and medicine. The tree has outstanding tolerance to drought and salt says UWA's Professor Guijun Yan. He worked with Chinese partners to read its genome and identify genes that could one day be introduced into other crops.

Sheep herders in Western China have tripled their income and reduced their herd size thanks to husbandry advice from Charles Sturt University researchers supported by the Australian Council for International Agricultural Research (ACIAR). Professor David Kemp was awarded The People's Republic of China Friendship Award in 2015 for his leadership of this and other projects benefiting Chinese farmers.

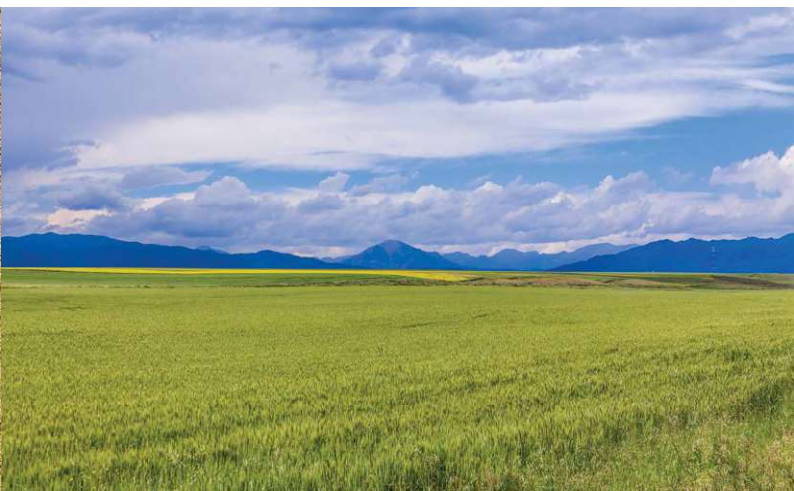
Photos: English side, top left, Professor Guijun Yan is improving wheat in China and Australia (UWA); English side, top right, Jujube fruit (Shutterstock); Chinese side, top right, wheatfield in Xinjiang; all other images courtesy Shutterstock and iStock.

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Australian Government





让小麦耐旱又高产

通过解码数百种小麦的基因秘密，大幅提高小麦的产量并改善粮食安全——这是中国与澳大利亚小麦研究人员近期的合作愿景。

中国种植小麦至少已有4000多年的历史，并已成为全球最大的小麦生产国，公顷小麦产量比1960年高出了近10倍。小麦研究人员表示，我们能做的还不止于此。

“在中国，小麦大多分布在内蒙古、河北和甘肃等旱地地区。这些地区的种植条件与西澳大利亚州很像。”西澳大学（UWA）的杰奎琳·巴特利（Jacqueline Batley）教授说。

“适宜的条件会带来高产量，而高温少雨则会使庄稼歉收。通过与中方合作，我们可以培植出更高产的耐旱作物。”

中澳两国已经有数十年的农业合作基础，例如：

- 共同参与解码小麦基因组的全球行动
- 西澳大学和兰州大学的合作项目：通过地面覆盖和耕作帮助中国农民更好地利用水资源
- 莫道克大学和中国农业科学院的合作项目：借助澳大利亚小麦的新基因组数据，生产更可口、更优质的面包

在这些合作的基础上，巴特利教授参加了一个新的项目。“在这个新项目中，我们正在共同分析来自中国和澳大利亚的共1500个小麦品种，”巴特利教授说，“与内蒙古农牧业科学院、甘肃省农业科学院和河北省农林科学院的同事一起工作真是令人激动。他们在田间作业和作物试验方面拥有丰富的经验。他们的实验室位于田地中间，便于试验最新的小麦品种。”

澳大利亚团队的专长包括基因组学的专业知识和每年产出八代作物的最新培育技术。

“我们发现待开发的小麦品种仍有许多。我认为，我们可以在未来几十年内不断提高小麦产量，”巴特利教授表示。

“成功的关键是保证澳大利亚与中国之间保持小麦品种方面的交流，”西澳大学的闫桂军教授指出。他表示，“有了改良版的小麦品种，我们不仅可以满足澳大利亚和中国在小麦育种计划中的重点要求，还可以助力全球粮食安全和可持续发展。”

该项目的合作伙伴还包括InterGrain公司、中国科学院、中国农业科学院、中国科学院北京基因组研究所。该项目获得了澳大利亚政府“全球创新连接计划”的支持。

更多合作

南澳大利亚州的海藻由中国公司青岛聚大洋藻业集团负责采收。该公司看重的是澳大利亚原产海藻中含有的海洋糖类物质，因其可用于制作蛋糕、果胶和药品等高价产品。该项目由弗林德斯大学的张卫教授发起。

枣是中国的传统食物和药物。西澳大学的闫桂军教授指出，枣树的耐旱性和耐盐性都非常好。他与中方合作伙伴一起解读枣树的基因组，找出相应基因，希望有一天能用于其他作物。

中国西部牧民缩小了牧群规模却使收入增加了两倍。这多亏了由澳大利亚国际农业研究中心（ACIAR）支持的查尔斯特大学的研究人员给出的畜牧建议。因其为帮助中国农民的诸多项目中做出的杰出贡献，上述项目的领导人大卫·肯普（David Kemp）教授获得了2015年度中国政府友谊奖。

英文版左上角：闫桂军教授正在改良中澳的小麦品种（西澳大学）；英文版右上角：红枣（图片来自Shutterstock）；中文版右上角：新疆的麦田；其他图片鸣谢Shutterstock和iStock

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