New Plants Shrug Off Salinity

Two new lines of salt-tolerant plants from ARS researchers may someday prove to be a boon not only for wheat growers but also for salt-laden wildland ecosystems. Salt tolerance in plants is a prized trait. That's especially true in the irrigated wheat-producing regions of the American West, where irrigation can accelerate buildup of salts.

Salinity reduces yields by weakening or killing plants. Nationwide, it's blamed for reducing crop yields by about 25 percent, according to ARS research geneticist Richard R.-C. Wang. He developed the new breeding lines, known simply as W4909 and W4910. The work has already attracted the attention of researchers and plant breeders throughout the United States and from several other nations as well.

Wang is with the ARS Forage and Range Research Laboratory in Logan, Utah. He's working to demystify the complicated genetics of rangeland plants—including some that are relatives of wheat. His investigations are key to making hardier and more nutritious forages for cattle and other livestock and for wildlife such as deer, elk, and moose.

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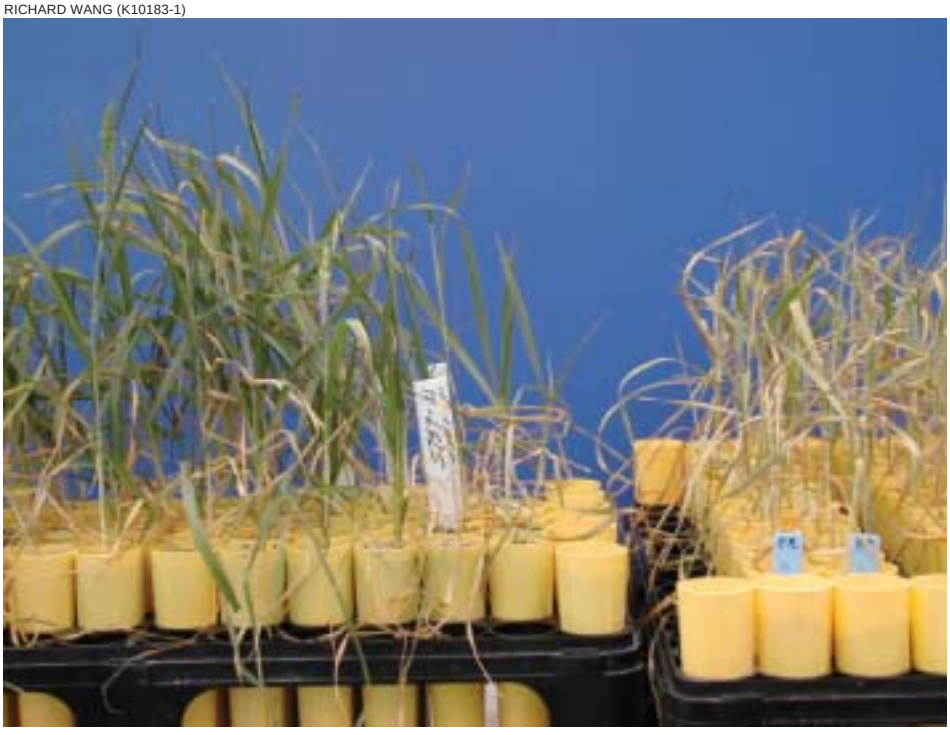

Exposure to high salinity is killing Yecoro Rojo (right), a wheat cultivar that has moderate salt tolerance. Plants resulting from hybrid crosses with W4910 (left) show much greater tolerance of high salinity.

In addition to providing forages for animals to graze, the improved plants that result from the Logan lab's research could be used to revegetate rangelands, roadsides, burned sites, or erosion-prone slopes.

W4909 and W4910 are the progeny of unique parents. One parent contains genes from wheatgrass, a wild relative of wheat. The second parent contains what's known as a *Ph*-inhibitor gene. That gene squelches another gene, *Ph1b*, that would otherwise block the transfer of wheatgrass genes into domestic wheat.

For the research, Wang collaborated with ARS geneticist Steven R. Larson of the Logan team; Catherine M. Grieve, an ARS plant physiologist at the ARS George E. Brown, Jr., Salinity Laboratory at Riverside, California; Michael C. Shannon, formerly at Riverside and now with ARS' Pacific West Area Office, Albany, California; Abdul Mujeeb-Kazi of the International Maize and Wheat Improvement Center; and four visiting scientists from China—Zanmin Hu, Xiaomei Li, Jiyi Zhang, and Xueyong Zhang.

Wang and his co-investigators are the first to use the *Ph1b* gene-inhibition technology to incorporate, into wheat genetic material, genes borrowed from another plant species.

The new plants serve as a handy model for discovering the function of wheatgrass genes. Explains Wang, "Once the wheatgrass genes are moved into experimental wheat plants, the genes may become easier for scientists to access and decipher. This approach not only serves as a starting point to improve wheat and rangeland plants, but helps us learn more about wheatgrass genes at the same time."—By **Marcia Wood,** ARS.

This research is part of Rangeland, Pasture, and Forages, an ARS National Program (#205) described on the World Wide Web at http://www.nps.ars.usda.gov.

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