

Seeking hardier breeds for drought, climate change

August 8 2012, by DAVID PITT



A light colored head of cattle bellows as it's calf follows along at the Gill Cattle Co. pasture in rural Parker County near Springtown, Texas, Wednesday, Aug. 1, 2012. Cattle are being bred with genes from their African cousins who are accustomed to hot weather. New corn varieties are emerging with larger roots for gathering water in a drought. Someday, the plants may even be able to “resurrect” themselves after a long dry spell, recovering quickly when rain returns. (AP Photo/LM Otero)

(AP) - Cattle are being bred with genes from their African cousins who are accustomed to hot weather. New corn varieties are emerging with larger roots for gathering water in a drought. Someday, the plants may even be able to "resurrect" themselves after a long dry spell, recovering quickly when rain returns.

Across American agriculture, farmers and crop scientists have concluded

that it's too late to fight [climate change](#). They need to adapt to it with a new generation of hardier animals and plants specially engineered to survive, and even thrive, in intense heat, with little rain.

"The single largest limitation for agriculture worldwide is drought," said Andrew Wood, a professor of plant physiology and molecular biology at Southern Illinois University.

On his Kansas farm, Clay Scott is testing a new kind of corn called Droughtguard as his region suffers through a second consecutive growing season with painfully scarce precipitation.

"These are products I really need," Scott said. "I couldn't be any happier that they are working on these products."

The urgency is also evident in Texas, where rainfall has been below normal since 1996. Crops and pastures were decimated in 2011 by a searing drought, and some got hit again this year. Ranchers have sold off many animals they couldn't graze or afford to feed. Cattle inventory, at 97.8 million head as of July 1, is the smallest since the U.S. Department of Agriculture began a July count in 1973.

At least one rancher is now breeding cattle with genes that trace to animals from Africa and India, where their ancestors developed natural tolerance to heat and drought.

Ron Gill, a rancher who also heads the animal science department at Texas A&M University, said research has been under way for years to develop cattle that can withstand heat and grow on lower-quality forage.



Cattle rancher Ron Gill looks over his herd as he checks his livestock's grazing pasture in rural Wise County near Boyd, Texas, Wednesday, Aug. 1, 2012. Gill has been cross breeding cattle with more drought tolerant breeds that can withstand heat and droughts better. Cattle are being bred with genes from their African cousins who are accustomed to hot weather. New corn varieties are emerging with larger roots for gathering water in a drought. Someday, the plants may even be able to “resurrect” themselves after a long dry spell, recovering quickly when rain returns. (AP Photo/LM Otero)

Last year, he started incorporating into his herd Beefmaster cattle, a cross between Brahman cattle, which originated in India, and European breeds that include Herefords and Shorthorns. He's also experimenting with the appropriately named Hotlanders, a Texas breed developed for its heat tolerance using genetics from Senepol cows bred in the Virgin Islands.

As ranchers replenish their livestock, the advice from experts is to breed drought tolerance into herds.

"We're telling people, 'Regardless of what you have to buy to restock, your future breeding programs need to target this new normal and re-establish a different paradigm than what we've had in the past,'" Gill said.

It's no different for farmers in the nation's Corn Belt, who are confronting a drought that stretches from Ohio west to California and from Texas north to the Dakotas. Only in the 1930s and the 1950s has a drought covered more of the U.S., according to the National Climatic Data Center in Asheville, North Carolina.

Nearly half of the nation's corn crop is in poor or very poor condition, as well as a third of soybeans.

The damage would be much worse without the crop science advancements of the last 40 years, said Andrew Wood, a professor of plant physiology and molecular biology at Southern Illinois University.

"This year's just terrible, but 20 years ago these crops would have been completely burned up," said Scott, who also grows wheat and raises cattle in Ulysses, Kansas. "This year we're going to grow a decent crop even with drought."

Until a few years ago, most research was designed to improve the plant's overall resistance to a variety of threats, including insects, weeds and diseases. But the effort also helped instill drought tolerance, said Roger Elmore, extension corn specialist at Iowa State University.



Cattle rancher Ron Gill puts out cottonseed feed for a calf reunited with it's

mother in rural Parker County near Springtown, Texas, Wednesday, Aug. 1, 2012. Gill has been cross breeding cattle with more drought tolerant breeds that can withstand heat and droughts better. Cattle are being bred with genes from their African cousins who are accustomed to hot weather. New corn varieties are emerging with larger roots for gathering water in a drought. Someday, the plants may even be able to “resurrect” themselves after a long dry spell, recovering quickly when rain returns. (AP Photo/LM Otero)

Now crop scientists want to go even further. In seed laboratories, they are developing corn varieties with larger roots to absorb more water and smaller tassels that save more of the plant's energy for making kernels. The new strains also have leaves that use less water for transpiration, the process that releases excess moisture after photosynthesis.

Wood is studying resurrection plants - mosses and ferns that dry up and look dead after being deprived of water for weeks but spring back to life when watered. The goal is to isolate genes that allow those plants to recover quickly from drought and transfer those traits to crops such as corn.

"We don't want to turn corn into a cactus," Wood said. His perfect plant would tolerate mild drought and, when it finally rains, quickly resume "normal biology and output."

Developed by St. Louis-based Monsanto and German-based BASF, Droughtguard is a combination of the best drought-tolerant seed.

Scott is among about 250 corn growers who are testing the variety on 10,000 acres (4,000 hectares) from South Dakota to Texas. His final judgment will come at harvest time, but he's encouraged by what he sees in the field.

"Pollination looks excellent, ear-fill is good," he said. "I'm excited to see what the yield looks like."

It's not clear yet how far this kind of engineering can be pushed and whether seeds can be developed to endure the most severe droughts.

"When you get so severe, basically nothing does well," said David Lobell, an environmental earth systems science professor at Stanford University.

While corn is the most studied and engineered grain it isn't the only crop getting attention.

New Mexico State University scientists are working on more drought-tolerant varieties of alfalfa to improve the nation's hay crop, which is critical for feeding dairy and beef cattle. Shortages have contributed to the widespread livestock sell-off.

At South Dakota State University, plant science professor Bill Berzonsky, announced last week the development of a new hard winter wheat variety he expects will outperform older seeds. It's not promoted as a [drought](#)-resistant product, but the wheat known as Ideal is designed to be planted in drier areas of the Dakotas, with better yield and more disease resistance.

Weather forecasters are working on their own climate-adaptation strategies, with the goal of helping farmers choose which crops to plant and when.

Eventually, meteorologists might be able to offer more precise seasonal forecasts that predict the number of days of continuous rain or days suitable for fieldwork.

"These are the kinds of things that have a disproportionately large influence on farming," said Gene Takle, director of Iowa State University's Climate Science Program.

The National Weather Service predicted months in advance that June and July would be hot and dry in Iowa, Takle said.

"What could we have said back in March that would have given farmers some actionable information to cope with this?" he said.

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