Research Roundup
Highlights of research outside our journals

Genome of Upland Cotton Sequenced

In a recent issue of *Nature Biotechnology*, researchers report on sequencing the genome of the world’s most widely cultivated and genetically complex species of cotton, a milestone that will make it easier to address increasing threats to cotton by tapping into its natural defenses.

Sequencing the genome of upland cotton (*Gossypium hirsutum*) will help breeders develop varieties of cotton that are better equipped to combat the pests, diseases, and higher temperatures and droughts expected to accompany climate change. Cotton growers have experienced a plateau in yields since the early 1990s, and most commercial varieties lack genetic diversity, making cotton vulnerable to natural threats. The findings will help researchers and breeders in the years ahead develop cotton varieties with improved fiber qualities, higher yields, and more tolerance to heat, drought, and diseases anticipated due to climate change. Cotton is grown on 12 million acres in 17 states and is a $6 billion crop in the United States.

The results will allow scientists to analyze two sets of extensive DNA data, compiled independently of each other, compare the results, and exploit cotton’s genetic diversity by tapping into the potential of genes found in the 10,000 accessions of exotic and wild cotton plants in the ARS Cotton Germplasm Collection in College Station, TX.

View the articles at: www.nature.com/nbt/journal/vaop/ncurrent/full/nbt.3207.html and www.nature.com/nbt/journal/vaop/ncurrent/full/nbt.3208.html.

—Source: USDA-ARS

Threats to Soil Productivity Outlined

A group of leading soil scientists, including ASA and SSSA Fellow Donald L. Sparks (University of Delaware), SSSA Fellow Ronald Amundson (University of California–Berkeley), SSSA Fellow and Past President Jan Hopmans (University of California–Davis), SSSA Fellow and President Carolyn Olson (USDA Climate Change Program Office), SSSA member A. Ester Sztein (National Academy of Sciences), and Asmeret Asefaw Berhe (University of California–Merced) has summarized the precarious state of the world’s soil resources and the possible ramifications for human security in a recent paper published in *Science*.

In a review of recent scientific literature, “Soil and Human Security in the 21st Century,” the authors wrote the paper to call attention to the need to better manage earth’s soils during 2015, International Year of Soils (www.soils.org/iys).

As the population of the planet grows toward 11 billion people by 2100, the key to producing enough food will be to find better ways to manage agricultural lands we already have, Sparks says, rather than expanding into new areas. However, this will mean overcoming some rather daunting challenges.

According to Sparks and his colleagues, soil erosion greatly exceeds the rate of soil production in natural areas. For example, in the central United States, long considered to be the “bread basket” of the nation, soil is currently eroding at a rate at least 10 times greater than the natural background rate of soil production.

The loss of soil to erosion also involves the loss of key nutrients for plant growth, leading to the use of commercial fertilizers. However, the current rate of fertilizer production is unsustainable, according to Sparks.

“Unless we devise better ways to protect our soil nutrients and make sure that they are being used efficiently rather than being washed away and headed for nutrient shortages,” Sparks says, “disruptions in food production could be geopolitical conflict. ‘Human civilizations have risen and fallen based on the state of their soils,’” he says, adding that security really depends on our ability to properly care for the earth beneath our feet.”

See http://www.sciencemag.org/content/348/6235/1261071.abstract

—Source: University of Delaware

How a GM Crop Can Have Diminishing Success at Fighting Off an Insect Pest

A new study from North Carolina State University and Clemson University finds the toxin in a widely used genetically modified (GM) crop is having little impact on the crop’s pests. The toxin, which is intended to kill pests, is found in a cotton variety marketed as Bollgard II. However, the study found that the toxin was not as effective as expected in controlling the cotton bollworm, a major pest in the southeastern United States.

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