The lights have been off for industrial hemp in the U.S. for more than 80 years. The USDA stopped keeping tabs on hemp seeds in the 1940s, and research publications within our Societies dropped off about the same time. There is no recorded production of hemp in the U.S. after the late 1950s. But ever since the 2014 farm bill allowed research institutions to grow industrial hemp, the future for this crop seems bright once again.

Even so, there are numerous research gaps and other issues that need to be addressed as a result of not producing industrial hemp for all of these years. Who will certify seeds? How will we breed hemp for the various uses that the marketplace demands? Filling these gaps in research and scientific knowledge for the U.S. hemp industry is the goal of CSSA’s conference The Science of Industrial Hemp, to be held in Denver, CO, 28–29 July 2016. ASA is a co-sponsor of the meeting.

Marketplace Needs to Drive Scientific Advancements

According to Hemp Biz Journal, U.S. hemp-based product sales will nearly triple in the period of 2012 to 2016. Projecting out to 2020, the industry will reach $1.5 billion in sales—contrast that to $5 billion for the cotton industry in 2015.

Europeans have been developing hemp as multi-purpose crops for more than a decade, according to Stefano Amaducci. He is one of the conference speakers, and the principal investigator for EU MULTIHemp, a project that “aims at developing hemp genotypes with enhanced traits suitable for diverse cultivation environments and to provide improved feedstock for a wide array of innovative end products generated within an integrated biorefinery.” Research will continue to provide varieties of hemp that provide long fibers for clothing, strong fibers for the auto industry, higher oil contents for food and personal products, and high-protein hemp for food and feed. Many EU countries lifted their ban on growing industrial hemp in the 1990s, giving them more knowledge of breeding and production than the U.S.

Ernie Small, principal research scientist for Agriculture and Agri-Food Canada, agrees that scientific advancements in hemp will be led by the marketplace’s needs. “Domesticated plant evolution is based on ‘artificial’ selection in contrast to ‘natural selection,’ which guides the evolution of groups in nature. Virtually all of the evolution of Cannabis is domestication—artificial selection. Historically, the major kinds of Cannabis plants (fiber, oilseed, and marijuana) are the result of human domestication by farmers. Today, more sophisticated plant breeding is producing improved cultivars to satisfy current market forces.” Following a 60-year ban, Canada began to allow commercial growing of hemp in 1998.

Supporting Breeders

Challenges of breeding are unique to hemp as well. “Cannabis is wind-pollinated, and very large distances are needed to prevent pollen contamination during breeding,” Small says. “Very few other crops are faced with as difficult a need for long-distance isolation.” In addition, “THC is controlled, so breeding for agronomic characteristics cannot be done without also simultaneously controlling for this.”

The USDA typically keeps track of the genetic traits of plant species, but they only kept a bank of hemp seed up to the 1940s, according to CSSA member Stephanie Greene, lead scientist with the Seed Preservation Program within the USDA. At the conference, Greene will discuss “the genetic resources of cannabis, including what collections are available internationally, and how we can rebuild the U.S. germplasm collection to support industrial hemp breeders.”

“Plant breeders use valuable traits found in old varieties, farmers’ seeds, and wild species,” Greene says. “Because industrial hemp has been a Schedule I controlled substance, continued on page 20
the USDA gene bank has not been able to maintain seed collections or distribute seed to breeders. Now is the time to determine what type of seed collection will support the efforts of industrial hemp breeders.”

Looking to international scientists to report on their research may be part of the answers for the U.S., with CSSA and ASA leading the way in hemp meetings and scientific information. Creating spaces where discussions between researchers can happen is another, and the Science of Industrial Hemp meeting will have plenty of time for networking.

Why Now?

Why is now the time for a meeting on the science of hemp?

“There have been multiple meetings that have focused more on the fledgling business side of hemp products,” says Ellen Bergfeld, CEO of the Societies. “Yet, there has not been anything that has focused on the science of production here in the U.S. As perceptions are changing about hemp as a legitimate product, separate from marijuana, and there is growing interest in and support for the products themselves, we feel that it is very important to focus on the science of industrial hemp production to help lift it out of obscurity as well.”

According to Small, restarting the hemp industry in Canada didn’t happen overnight, and, so it won’t in the U.S., either. “As with any crop that hasn’t been grown for many years, progress was slow because of a lack of knowledge on the part of producers, product developers, marketers, and regulators,” Small says.

The Science of Industrial Hemp conference will hopefully increase the speed with which knowledge is shared, connections are made, and the industry rebuilds itself. For more information about the meeting, visit www.crops.org/meetings/hemp-meeting.

Cross-cutting Special Session Announced for Phoenix Meeting: Manufactured, Blended, and Engineered Soils for Urban Applications

In urbanized and developed lands, custom-blended soils or soils engineered for a specific environmental function are increasingly common. These manufactured soils may be designed to ameliorate degraded land to support vegetation, filter stormwater, remove pollutants, or have physical characteristics—such as low weight for green roofs or stability for heavily trafficked areas—that allow them to serve specific functions in built or engineered environments.

At the Annual Meeting this November in Phoenix, you are invited to join us for a special session to discuss the state of the science of manufactured, blended, and engineered soils and articulate challenges and opportunities for research and practice in the context of environmental sustainability. This trend bridges a wide range of disciplines as society increasingly designs ecological systems in urbanized areas and creates new opportunities for soil scientists as well as posing novel challenges for science and practice.

Speakers include Dr. Pamela Hazelton, School of Civil and Environmental Engineering, University of Technology, Sydney, Australia, co-author of Understanding Soils in Urban Environments, a comprehensive handbook for engineers working with soils; Dr. Bill Krueser, University of Nebraska–Lincoln, who will speak on the pedology of engineered turfgrass soils; Dr. Nick Basta of Ohio State University who will examine unique soil blends to remediate urban soil contamination; Dr. Scott B. Jones of Utah State University who will review the state of the art in sensing of soil properties and processes; and Dr. Susan D. Day of Virginia Tech who will introduce the session and give a perspective on manufactured soils for urban trees. The meeting will end with a moderated discussion with all panel members. For more information about the session, contact Dr. Susan D. Day, Chair of SSSA’s Urban and Anthropogenic Soils Division, at sdd@vt.edu.

Tentative program time: 1 to 2:45 pm, Tuesday, 8 Nov. 2016. Sponsoring Divisions and Sections: SSSA’s Urban and Anthropogenic Soils, Wetland Soils, Soils & Environmental Quality, and Soil Consulting Scientists Divisions; CSSA’s Turfgrass Science Division; and ASA’s Environmental Quality Section.