

Who ARS Serves:

Consumers, Farmers, Communities, and Research Partners

ARS strives to supply publicly available data and local, regional, and national tools and information that support American taxpayers. Providing accurate and user-friendly agricultural data that is available for land managers, farmers, and ranchers is valuable to enhance profitability for all stakeholders. ARS is continuing to develop databases such as the collection of gridded temperature data, which is used to determine county-level freeze/frost trends, to help minimize crop losses.



Expanding access to digitized agricultural data and resources enables the public to further utilize ARS research and assists non-traditional stakeholders such as homeowners. The following milestones in 2022 demonstrate how ARS research supports fact-based, data-driven decision-making.

Regional freeze date trend tool for important cropping decisions. Specialty and row crop production are being severely affected by changing freeze dates and growing season length. Various measures of climate changes, including temperature, precipitation, and humidity data, exist regionally and nationally, but there were no measures for local updates about changes in last-spring and first-fall freeze dates. Previous maps from the 4th National Climate Assessment showed only season-length changes by multi-state regions. ARS staff in Ames, Iowa, cooperated with the USDA Midwest Climate Hub and the Midwest Regional Climate Center at Purdue University to create a publicly available county-level freeze/frost date tool using gridded temperature data collected since 1950 to calculate and display trends in first fall and last spring freeze dates and growing season length. Specialty and row crop producers can use this information to improve crop management decisions in a changing climate and minimize crop losses and damage related to unseasonal frost events. (NP 216)

Development of a gold-standard, chromosome-scale reference genome of an octoploid strawberry. Molecular breeding and genetics research in strawberry (Fragaria x ananassa) was historically hampered by its complex genome, which contains eight complete sets of chromosomes within a single cell (humans have only two complete sets). This prevented the accurate design and development of subgenome-targeting molecular markers, underlying gene content and function analyses, and haplotype structure assessments, all of which are core aspects of modern plant genetics. An ARS researcher in Corvallis, Oregon, collaborated with the public strawberry breeding program at the University of California, Davis, in using cutting-edge sequencing and assembly tools to develop a new genome assembly of the strawberry cultivar 'UCD Royal Royce.' The assembly, called FaRR1, is greatly superior to previous octoploid genomes and represents the closest approximation of octoploid strawberry chromosomes as they exist in an actual plant cell nucleus to date. It is publicly available and has already been used for development of new molecular marker platforms to support public strawberry research. (NP 301)

Database development improves homeowner turfgrass selection. Since 1981, the National Turfgrass Evaluation Program (NTEP) has collected data on tens of thousands of experimental and commercially available turfgrasses, encompassing 20 species across multiple locations in the United States and Canada. As part of NTEP, ARS researchers in Beltsville, Maryland, assembled, reviewed, analyzed, and reported these data via media and the NTEP website, and a database was recently created to house and serve the nearly one million data records collected. Through a USDA Specialty Crop Research Initiative grant to develop low-input grasses, ARS and University of Minnesota collaborators added fanleaf fescue to the publicly available database in July 2022. Development of tablet and smartphone apps are underway and will enable homeowners to locate the best cultivar based on their location, soil type, tree canopy situation and other factors. (NP 215)

A powerful national soil health interpretation and recommendation tool. The adoption of soil health practices has been hampered in part by the lack of a scientifically robust and user-friendly interpretation tool. An ARS researcher in Columbia, Missouri, led a team of scientists from multiple other institutions in developing a framework called the Soil Health Assessment Protocol and Evaluation (SHAPE). This tool accounts for inherent site conditions, such as soil type and climate, and provides a soil health score for up to four soil health indicators at any location across the continental United States. Version 1.0 of SHAPE is complete and is publicly available online via GitHub and as a Shiny App. This research benefits producers and scientists by providing an improved soil health interpretation tool to monitor changes in soil health, provide management recommendations to landowners, and inform soil health programming efforts. (NP 212)



Learn more about National Program 212



Learn more about National Program 215



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