Cotton Winter Nursery (CWN) Update

The Cotton Winter Nursery (CWN) has been a vital part of the cotton research community for over 60 years, the last 6 years near Liberia, Costa Rica. It serves to drive genetic gain and generation advancement with two growing seasons completed each year. For the first 50+ years the CWN was in Mexico, but due to the retirement of the National Cotton Council site manager and mounting safety concerns, it was relocated to Costa Rica in 2015. Alfonso Palafox, an employee in Mexico for a dozen years, was hired to manage the Costa Rica CWN operation. The CWN is located 9km northwest of Liberia, Costa Rica on the Pan American Highway.

Costa Rica was chosen primarily because of the suitable cotton growing environment, affordable labor force, available water, and reliable flights to and from the United States. Our farm office is located in a 60' x 50' building adjacent to the two hectare farm and provides suitable space to process, gin, and ship seed. A drip, irrigation system was installed which allows for efficient use of water. We built an acid delinting system so 'black' seed could be shipped to users in the US, reducing transportation time between the the CWN and US scientists by three weeks. Other site improvements during the past few years include addition of native bushes for wind breaks and precise land leveling.

The CWN is critical for proper characterization of the ~10,000 accessions in the National Cotton Germplasm Collection, about 35% which are photoperiod sensitive. These photoperiodic accessions are maintained in the 'carryover' nursery where plants are observed for up to four years to enable self-pollination to be completed. USDA staff travel to the CWN to collect phenotypic trait data using a standardized system.

Due to Covid-19 restrictions, 2020 was an especially trying time in Costa Rica, especially at the CWN. For a period extending several months during Spring 2020, the government restricted travel and commerce for 5 days at a time, then allowed restricted movement for the remaining 2 days per week. Alfonso tackled this challenge with dedication and planning. He, his wife, and one staffer lived full time at the farm for those 5 days periods to process, gin, delint, and ship seed, and in the end all 2019-20 CWN users received their seed in time for on-time planting in the U.S. Alfonso performed exceptionally well for the cotton research community to overcome adversity created by Covid-19.

The tables show the hill numbers (plots) and percentage of hills by the USDA and university scientists for the past 6 growing seasons. The number of hills a scientist requests varies from year to year depending on their research needs and budget constraints. One explanation for the varying numbers/percentages is due to 'special' projects such as the Nested Association Mapping Population seed increase in 2017-18, a project managed by the NCSU breeder.
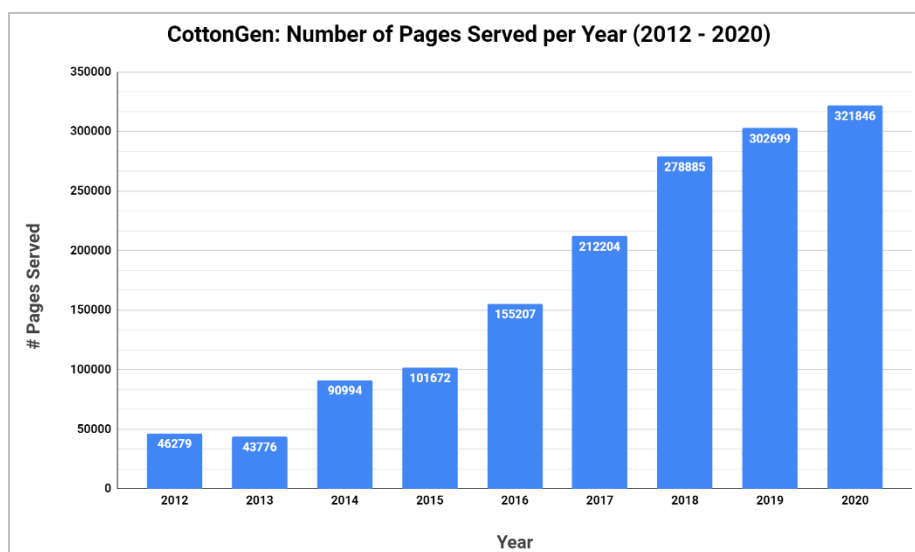
Number of Hills by User in CWN

	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
USDA	1907	2435	2250	3521	3036	2902
University	2603	3392	3727	967	2395	1635
TOTAL	4510	5827	5977	4488	5431	4537

Percentage of Hills by User in CWN

	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
USDA	42%	42%	38%	78%	56%	64%
University	58%	58%	62%	22%	44%	36%

CottonGen Database Update

As noted on the [website](#), CottonGen is the cotton community's genomics, genetics and breeding database to enable basic, translational and applied research in cotton. It was built using the open-source Tripal database infrastructure. CottonGen consolidated the data from two previous databases, CottonDB and the Cotton Marker Database, and includes sequences, genetic and physical maps, genotypic and phenotypic markers, QTLs, trait evaluations, pedigrees, and relevant bibliographic citations. It is continually being updated to include annotated transcriptome, genome sequence, marker-trait-locus and breeding data, as well as enhanced tools for easy querying and visualizing research data. The graph below show usage since inception in 2012.

CottonGen: Number of Pages Served per Year (2012 - 2020)

Year	# Pages Served
2012	46279
2013	43776
2014	90994
2015	101672
2016	155207
2017	212204
2018	278885
2019	302699
2020	321846

To provide for more permanent funding support, a request has been prepared and submitted to the National Cotton Council asking them to lobby for 100% financial support of CottonGen. We are hopeful this effort yields a positive response, but until we hear the result, we are asking for SAAESD's continued financial support which is critical to this database.