

Cotton germplasm committee Meeting

1/14/2025 New Orleans, La

Attendees: Duke Pauli, Don Jones, Todd Campbell, Jodi Scheffler, Cory Mills, Jenny Koebernick, Jack McCarty, Josh Udall, Jim Olvey, Mauricio Ulloa, Tom Brooks, Peng Chee, John Yu, Fred Bourland.

Peng Chee called meeting to order. Jenny was announced as secretary.

Todd Campbell made motion to approve minutes and Jodi seconded.

General discussion around purpose of the committee.

- Committee helps provide guidance on cotton germplasm
- Accounting mechanism for USDA
- A place where USDA can provide updates
- We represent stakeholders of the cotton germplasm
- Keep crop vulnerability statement up to date

Before retiring from the NPGS, Peter Bretting's goal was to advocate for congressional support for all crops. Neha Kothari has since replaced him as the National Program Leader of the NPGS.

The committee has sent a letter, drafted by Peng, to Peter congratulating him on his retirement. Peng asked whether it would be appropriate to send a similar letter to Neha to congratulate her on her new position. The committee agreed, and Peng will draft the letter and circulate it to the committee for signatures.

Cotton Winter Nursery (CWN)

Don Jones reported that it has been a wet planting season. He and Jim Olvey visited in August, and it was already wet then, and continued to rain. The second and third shipments were planted together, with dates recorded in the notes. Alfonso Palafox, Director of Operations for the winter nursery, has relocated the operation and built a new office and facility across the highway, but he has not yet had time to improve the soil. When Don visited most recently, conditions varied greatly, with some areas looking very good and others very poor. A hurricane brought additional heavy rain. As of December 3, the field had not been planted. This is the second consecutive year with difficulty getting crops in the ground, and Don advised expecting lower seed yields this year compared to previous years.

There will be 12–15 people visiting the winter nursery from February 11–13. Some attendees will be growers, while others will be senior personnel from the USDA. Jim Frelichowski mentioned that he will be traveling to the nursery on February 8.

Jim Olvey asked whether someone would be available to help take notes when material is sent down.

Peng mentioned efforts to generate interest among growers and that he and Don recently published an article in *Cotton Grower*.

Don mentioned that Cotton Incorporated has introduced a new funding mechanism that is more stable for the winter nursery. He also reported receiving three inquiries from private industry, primarily regarding phenotyping and seed increases. However, these activities will not take place this year.

Cotton Breeding Committee: support from stakeholders to increase costs of winter nursery but that's up in the air.

Update from Jim F.

- Table 1: Update on the contents of the collection. 9,664 accessions of cotton. Since Jim was hired, there have been 791 new accessions. Currently 160 are pending.

Jim Olvey asked what traits are being tested? Response was roundup ready and 2 bollgards.

Lori Hinze said they test 100 seeds, sometimes its found in 10 lots of 10 seeds. Prefer the developer to clean it up.

- Table 2: Exotic (sub collections), 3 locations: greenhouse, college station, costa rica (CWN)

Todd asked about the timeline for determining what goes to CWN—whether this is done every 5 years or 10 years. Jim F. responded that there is a list, but it needs to be trimmed down. Efforts are underway to perform germination tests to help reduce some entries. Josh added that Plant Disease Recovery has provided additional funding to increase certain lines for screening. Once Lori completes seed cleaning, those lines will be increased. Some lines are more challenging and require special attention.

Janna Love retired in November; she possessed extensive institutional knowledge. Her position is currently being advertised, and interviews are expected to take place within the next month, with the goal of filling the position by May.

- Table 5. Hard to get things finalized in GRIN. India has requested the most from the foreign countries.

Josh stated that the policy is to send 25 seeds for distribution. Occasionally, requested seeds are sent to the CWN. He suggested that for individuals needing additional seed, 25 seeds should be sent initially, and if more are required, Alfonso can be paid to increase the quantity. If the requested increase exceeds normal levels, a larger seed increase will be necessary.

Jack McCarty noted that a potential caveat is that sending seeds from different increase lots could create inconsistencies, which may be problematic for studies.

Peng suggested that it would be faster to borrow from the collection to expedite the process. Don noted that the issue is primarily logistical. Jim F. and Peng discussed handling foreign requests as a way to help offset costs. Peng suggested that foreign requesters could pay for the seed increase. Josh responded that this is not possible due to restrictions related to the NPGS and other crops.

Peng informed the group that Neha had raised several questions and asked for guidance on how to address them—specifically, whether these issues should be handled by the committee or managed internally within the agency.

Jim noted that there are a few issues with seed configurations. Lori is currently using the system with diploids and utilizing a seed scanner to measure seed dimensions. She added that the goal is to develop a publication and extend the technique to other crops. Duke mentioned that other systems might be more effective, but Jim responded that seed viability can be assessed based on the seed dimensions.

Josh mentioned that the collection is prepared to receive the NAM population from Andy Paterson, with funding from Cotton Inc. to expand the vault capacity. Duke asked what genotypic data is available, and Don responded that all the parents are sequenced and that a significant portion of the approximately 5,000 lines has been skim sequenced.

John Yu asked how edited material is handled, noting there was extensive discussion at PAG. Josh responded that the NPGS is managing the gene-edited material. John added that, within a species, this does not constitute a transgene.

Lori motioned to adjourn.

Cotton Crop Germplasm Committee Meeting

2026 Beltwide Cotton Conference, San Antonio Marriott River Center

January 7, 2026

U.S. National Cotton Germplasm Collection (NPGS-COT) report for the calendar year 2025.
USDA-ARS-PA-SPARC, Crop Germplasm Research Unit (CGRU), College Station, TX.

James Frelichowski (Curator/Geneticist Plants)

Joshua Udall (Research Leader)

Lori Hinze (Research Geneticist)

John Yu (Research Geneticist)

NPGS-COT Status

GRIN-Global (GG) lists 11,251 active accessions in the NPGS-COT site; 9,289 available for distribution; and 6,163 backed-up in Fort Collins, CO. The breakdown of species and age of seed inventory is listed below in Table 1. Unavailable accessions are due to low seed amounts. They are prioritized for seed increase. There are **six sub-collections** of accessions including SA (old cultivars and released germplasm), TEX (wild and landraces of *G. hirsutum*), GB (*G. barbadense*), diploid species A₁ (*G. herbaceum*), A₂ (*G. arboreum*), and Other species. They correspond to genome type and species, and facilitate organization in seed vaults. To address the overall 15+ year age of much of the NPGS-COT, the initial efforts to refresh the seed inventory is with SA to measure, confirm, barcode label, germ test, and update data in GG.

Table 1. *Gossypium* species by age breakdown of the NPGS-COT, and items and accessions (ACC) distributed through GRIN-Global in 2025.

Taxon	Total ACC	< 15 years	15 – 30 years	> 30 years	Items	ACC
<i>G. anomalum</i>	6	2	3	1	5	3
<i>G. arboreum</i> (A ₂)	1700	751	903	46	59	40
<i>G. areysianum</i>	1	0	0	1	0	0
<i>G. aridum</i>	14	1	3	10	4	3
<i>G. armourianum</i>	10	1	1	8	5	2
<i>G. australe</i>	14	0	7	7	5	5
<i>G. barbadense</i> (GB)	1468	443	822	203	1122	669
<i>G. bickii</i>	5	0	3	2	3	2
<i>G. captis-viridis</i>	1	0	0	1	0	0
<i>G. costulatum</i>	3	0	2	1	0	0
<i>G. darwinii</i>	138	0	42	96	9	5
<i>G. davidsonii</i>	27	0	4	23	4	3
<i>G. ekmanianum</i>	5	0	5	0	0	0
<i>G. exiguum</i>	1	0	1	0	0	0
<i>G. gossypioides</i>	8	4	3	1	8	4
<i>G. harknessii</i>	20	0	2	18	1	1
<i>G. herbaceum</i> (A ₁)	180	31	135	14	26	19
<i>G. hirsutum</i> (SA)	3489	1745	1715	29	2144	1331
<i>G. hirsutum</i> (TEX)	2014	1022	727	265	430	383

<i>G. incanum</i>	4	0	3	1	0	0
<i>G. klotzschianum</i>	60	1	3	56	7	2
<i>G. laxum</i>	5	0	3	2	0	0
<i>G. lobatum</i>	5	0	3	2	2	2
<i>G. longicalyx</i>	4	1	2	1	4	2
<i>G. marchantii</i>	3	0	2	1	0	0
<i>G. mustelinum</i>	22	0	16	6	10	5
<i>G. nandewarensense</i>	6	1	2	3	2	1
<i>G. nelsonii</i>	5	2	2	1	2	2
<i>G. nobile</i>	4	0	4	0	0	0
<i>G. populifolium</i>	2	0	0	2	0	0
<i>G. pulchellum</i>	1	0	1	0	0	0
<i>G. raimondii</i>	56	3	7	46	10	6
<i>G. robinsonii</i>	4	0	1	3	0	0
<i>G. rotundifolium</i>	1	0	1	0	0	0
<i>G. schwendimanii</i>	1	0	1	0	0	0
<i>G. somalense</i>	3	1	1	1	0	0
<i>G. stocksii</i>	3	1	0	2	4	4
<i>G. sturtianum</i>	8	2	1	5	10	5
<i>G. thurberi</i>	39	20	6	13	14	10
<i>G. tomentosum</i>	12	0	9	3	2	1
<i>G. trilobum</i>	11	3	4	4	4	3
<i>G. triphyllum</i>	1	0	1	0	0	0
<i>G. turneri</i>	8	0	1	7	0	0

GG age search June 2025, GG order items search Dec 11, 2025

Germplasm Emergence

NPGS-COT performs emergence testing and currently does not run germination tests.

Emergence tests assess seed viability, help prioritize seed increases, and adjust the amount of seed sown at the CWN. Emergence evaluations of SA (640), TEX (18) and GB (164) accessions were conducted based on a prior filtering of SA inventory by seed quantity and age (Table 2).

Seeds were sown in emergence mix in trays in USDA greenhouses. Of the several inventories/accession, only the current distribution inventory (vault storage bottles) of SA was evaluated. Past emergence test of A₁ and A₂ used all seed inventory in College Station vault.

Table 2. Summary of 2025 emergence evaluations of collection accessions.

Emergence %	Germinated in 2025 ^a				Previous years ^b		
	SA	TEX	GB	Total	A ₁	A ₂	Total
0	15	6	23	44	117	396	513
<10	0	0	0	0	10	17	27
10 - 49	174	7	9	190	104	197	301
50 - 75	112	2	20	134	75	243	318
>75	339	3	112	454	95	1953	2048
total	640	18	164	822	401	2806	3207

^a seed in default inventory (vault drawer bottles) were evaluated

^b All inventory lots were evaluated

Seed Increases

Three environments used for collection seed increases – College Station (CS), greenhouse at College Station (GH), and the Cotton Winter Nursery (CWN, Tables 3-6). Each environment has a distinct role in maintaining seed stocks of the cotton collection. The CWN is used to increase tropically adapted accessions (TEX), as well as many of the old cultivars (SA). The CS environment is used to increase SA accessions not increased at the CWN, critical A₁ and A₂ accessions, or other accessions that need special attention. Currently, the GH is for perennial exotic *Gossypium*, and also serves as a last resort for the most critical and difficult to cultivate accessions of SA, TEX and GB.

Based on the emergence results above, 549 accessions were selected for seed increase at the CWN. For most accessions, 20 - 40 seeds were planted in the CWN in five separate hills. For 10 of the 413 SA accessions, 150 seeds were planted because they had zero – 10% emergence in the tests. Of those 10, six failed, two had less than a full stand, and two had a full stand.

Table 3. NPGS-COT new seed increase plots of unique accessions according to sub-collection in 2025 and locations in Costa Rica (CWN) and College Station (CS, GH). Totals for 2025 are listed by sub-collection and overall. CWN 2026 shows seed already planted for increase in Costa Rica.

	CWN 2025	CS 2025	GH 2025	Total 2025	CWN 2026	CS 2026	Total 2026*
SA	153	0	61	214	413	200	613
TEX	61	0	11	72	4	0	4
GB	0	0	41	41	132	0	132
A ₁ , A ₂ cotton	0	0	0	0	0	0	0
AD tetraploid	0	0	0	0	0	0	0
Rest of diploids	0	0	0	0	0	0	0
Totals	214	0	113	327	549	200	749

* GH numbers are counted at year end and new plantings are determined during 2026 by replacement of perennial plants (600 min seed yields for A₁, A₂, SA, GB, TEX, but all other *Gossypium* species kept as perennials until 3000+ seed harvested and tested for emergence).

Table 4. Number of accessions of the NPGS-COT in new seed increase plots at the CWN according to year and sub-collection categories. The ten annual checks were not counted in this table.

Year	A ₁ , A ₂	GB	SA	TEX	AD spp	Rest of diploid spp	CWN Totals
2016	11	90	86	0	0	0	187
2017	0	107	62	39	0	0	208
2018	0	135	8	133	0	0	276
2019	0	87	10	276	0	1	374
2020	0	3	8	308	0	0	319
2021	0	2	135	170	0	0	307
2022	0	2	31	140	0	0	173
2023	105	2	66	0	0	0	173
2024	112	4	50	0	0	0	166

2025	0	2	161	61	0	0	224
2026	0	132	413	4	0	0	549
Totals	228	566	1030	1131	0	1	2956

Table 5. Number of unique accessions of the NPGS-COT in new seed increase plots in College Station, TX summer field plots (CS) according to year and sub-collection categories.

Year	A ₁ , A ₂	GB	SA	AD spp	Other diploids	CS Totals
2016	0	4	42	0	0	46
2017	0	0	56	0	0	56
2018	2	16	55	6	4	83
2019	14	5	58	0	9	86
2020	6	0	109	0	0	115
2021	6	2	81	0	0	89
2022	25	0	3	0	0	28
2023	152	0	0	0	0	152
2024	58	0	9	0	0	67
2025	0	0	0	0	0	0
Totals	263	27	413	6	13	722

Table 6. Total seed increases plots of accessions of the NPGS-COT in the CWN, CS, and GH

Year	CS Totals	GH totals	CWN totals	Grand total
2016	46	16	187	249
2017	56	60	208	324
2018	83	6	276	365
2019	86	13	374	473
2020	115	77	319	511
2021	89	293	307	689
2022	28	3	173	204
2023	152	156	173	481
2024	67	234	166	467
2025	0	113	224	337
Totals	722	971	2407	4100

New germplasm from expired Intellectual Property Rights (ex-PVP, JPR)

Each year new germplasm enters the collection as proprietary cultivars initially registered with the Plant Variety Protection Office (PVP). Upon expiration of protection period the NPGS-COT is contacted by the NLGRP for receiving such seed and site ownership of the record in GG is transferred to the NPGS-COT Site. To date, more than 400 cotton PVP accessions have been received by the collection from NLGRP (Table 7) and 401 are listed in GG as active for COT (Site ID) and about 50% have been assigned new SA numbers (205 accessions) and new GB numbers (3 accessions) and 173 listed as available. In 2025, 77 accessions were received by the National Laboratory for Genetic Resources Preservation (NLGRP) with 55 as expired PVP.

Additional accessions are expected each year (Table 7). Users interested in the status of cotton cultivars with intellectual property protection, including PVP, can view the issued certificates at <https://www.ams.usda.gov/services/plant-variety-protection>. We do not distribute materials with traits that are pending EPA obligations even if they might be off-PVP.

Table 7. GRIN-Global summary of PVP (issued) and xPVP (expired) with additional breakdown by genetically engineered or conventionally bred.

PVP certificate status	Total	Genetically Engineered (GE)	Non-GE
Certificate Expired (18 Jan 1991 to 2 Dec 2025)	415	110	305
Certificate Issued, expires in 2026	16	13	3
Certificate Issued, expires in 2027	7	4	3
Certificate Issued, expires in 2028	0	0	0
Certificate Issued, expires in 2029	16	14	2
Certificate Issued, expires in 2030	10	10	0
Certificate Issued, expires after 2030	259	150	109

When accessions are received from NLGRP (Ft. Collins, CO), the seed packets are assigned inventory numbers but accessions with GE traits are not available as per current USDA-ARS policy. Non-GE accessions are tested for adventitious presence of transgenes (AP) of GE proteins using Enviroligix lateral flow device strips. During 2025, 88 accessions were tested, and 13 accessions were positive for at least one GE protein (14.8% accessions with AP). The strips tested for proteins including Cry1Ac, Cry2A, CP4 EPSPS, and PAT/bar. One hundred (100) seeds per accession are tested as 10 bulks of 10 seeds each. USDA/ARS genebanks aspire to 0% AP, but test for AP at <1% detection level. If one bulk is positive for any GE protein, the accession is categorized as “Potential AP of GE trait. Do not distribute”. Procedures to mitigate the effects of AP are then followed. If no GE proteins are detected, the accession goes into the queue for seed increase. Accessions confirmed as non-GE are scheduled for seed increase to produce sufficient seed for public distribution and are marked as ‘Available’ (distributable) in GG.

Germplasm Distributions

Germplasm from the collection can only be requested by placing and ordering through GRIN-Global website of the National Plant Germplasm System (NPGS), <https://npgsweb.ars-grin.gov/gringlobal/search>. In 2025, 3752 seed packets were distributed. The domestic commercial users accounted for highest demand with distribution of 1463 items.

Table 8. Orders processed by the NPGS-COT in 2025 according to user type.

User category	Orders	Items
STA US state agencies and all universities	39	486
UARS Agricultural Research Service	9	426
UCOM US commercial company	10	1463
UIND US individual no affiliation	1	2

UPRU US non-profit organizations	3	7
UFED US Federal agency (not AID or ARS)	3	1383
FCOM Foreign commercial company	3	103
FPRU Foreign non-commercial org.	4	46
Grand Totals	72	3916

NPGS-COT Changes and Activities

During 2025, inconsistencies and discrepancies were found between the physical seed inventories and their representation in GRIN-Global. Correction action is underway to address these issues, update GG in real time, and to improve curation efficiency. This action is best summarized as an audit of the seed collection where the status of each accession is confirmed and verified in GG. Dr. Lori Hinze is leading this effort and has weekly progress updates with Dr. Neha Kothari. Details of these efforts will be described outside of this report as the main part of her presentation to Germplasm Committee and stakeholders.

To aid in the collection audit, Drs. Lori Hinze and James Frelichowski visited the Plant Introduction Station in Griffin, GA. The Griffin location provided suggestions to improve efficiency and modernize equipment. They also provided a functional example of a GG centered workflow – including SQL queries – to accomplish these seed-bank conservation efforts. Drs. Lori Hinze and James Frelichowski had one-on-one time with individual curators and technical staff. Since that visit, barcode printers, software, and image scanners have been installed. The audit of the SA sub-collection was deemed highest priority. Recording each SA bottle for age, seed index, seed weight and quantity, and adding a fresh barcode label to a fresh bottle is underway.

A recent paper describing the NPGS-COT was recently published.

Hinze LL, Udall JA, Yu JZ, Frelichowski JE (2025) The National Plant Germplasm System cotton collection—a review of germplasm resources, phenotypic characterization, and genomic variation. *Theoretical and Applied Genetics* 138:220. 10.1007/s00122-025-05009-4

Acknowledgements

Cotton Incorporated for support of NPGS-COT activities involving seed regeneration at the CWN and in USDA greenhouses. Dr. Peng Chee (CGC Chair/Professor UGA) and Dr. Jodi Scheffler (Geneticist CGRU Stoneville MS) for additional support of NPGS-COT regeneration activities at the CWN. Drs. Wayne Smith and David Stelly of Texas A&M University at College Station for additional support (Post Doc. and student labor). The Griffin, Georgia PGRCU (led by Dr. Melanie Harrison Supervisory Research) research and scientific staff for follow-up assistance with implementation of improved curation activities for the NPGS-COT. Staff at the USDA-ARS NLGRP in Fort Collins, CO and DBMU (Beltsville) for continued assistance with improved utilization of GRIN-Global for the NPGS-COT. Dr. Louis Prom (Research Plant Pathologist, College Station, TX) and Dr. John Yu for assistance with USDA greenhouse culture of critical accessions.