**Minutes**

**2020 Sugarcane Crop Germplasm Committee Meeting**

**Virtual Meeting via Zoom**

**June 16, 2020**

**Chaired By Dr. Anna Hale, USDA-ARS, Houma, LA**

**Attendance:** Roll call not taken.

**AGENDA**

|  |  |  |
| --- | --- | --- |
| 9:00-9:10 | Introductions and welcome | **Zoom:**  Meeting ID: [160 665 3292](https://www.zoomgov.com/j/1606653292?pwd=eVh4NjFJWVlPeWdpTFliZU1UMktUZz09)  Access Code: 623813 |
| 9:10-9:15 | Approval of previous meeting’s minutes (previously sent to committee) | Collins Kimbeng – LSU Ag Center, Baton Rouge, LA |
| 9:15-9:25 | National Germplasm Resources Laboratory’s 2017 Report to PGOC, RTACs and CGCs | Gary Kinard, USDA-ARS-NGRL, Beltsville, MD |
| 9:25-9:40 | Report on the Status of the World Collection at SHRS, Miami | Ricardo Goenaga, USDA-ARS, Miami, FL |
| 9:40-9:50 | NPL Report | Peter Bretting, Beltsville, MD |
| 9:50-10:10 | Discussion of importation of non-stalk material from foreign sources. | Charley Richard, C. Richard and Associates, LLC., New Orleans, LA and Chris Laborde, U.S. Sugar Corp., |
| 10:10-10:25 | BREAK |  |
| 10:25-10:35 | Nomination of Committee Members and Officers |  |
| 10:35-11:20 | New Topics and Open Discussion (GRIN system, tissue culture, databases, etc.) | Open Discussion |
| 11:20 | Adjourn |  |

Meeting was called to order by Chair Dr. Anna Hale at 9:00 AM.

**Approval of previous meeting’s minutes, Collins Kimbeng – LSU Ag Center, Baton Rouge, LA**

* Collins asked Jim to supply verbiage for a motion he made in the 2019 meeting.

**Ref:** Jim proposed a formal motion Seconded by Jeff: (**specific verbiage of motion missing**)

* Chair Anna Hale tabled the minutes for approval later.

**National Germplasm Resources Laboratory’s 2017 Report to PGOC, RTACs and CGCs; presented by Gary Kinard, USDA-ARS-NGRL, Beltsville, MD**

* Three projects help support the agency’s genetic resource collection with emphasis on the National Germplasm Resource System.
* **Plant Exchange Office** supports taxonomy.
* Sugarcane did not submit a proposal for exploration in FY 20.
* Explorations that were lined up may not happen because of Covid.
* A couple of exploration may be able to go forward but most of them will not, at least this year. We may be able to reenact the agreement.
* The dateline for submission in 20-21 FY is late July.
* **GRIN** continued to operate normally during the pandemic.
* However, the **Gene Banks** have had some degree of disruption during the pandemic due to staffing issues.
* Particularly, distribution of foreign germplasm has suffered for several reasons.
* The **GRIN** website is fully functional. IT staff have continued to develop new software.
* **GRIN Global**: The new version was released in May 2020 for public comments.
* It has been submitted to USDA for security review and should be out by July 2020.
* It is more intuitive than the current one with several new features and functions.
* User profiles will carry over to the new website.
* Dimitri will talk about **Plant Pathology**.

**NPL Report; presented by Peter Bretting, Beltsville, MD**

* USDA National Germplasm system: 20 sites, some collocated at land grant universities.
* Some private sector participation.
* **Accessions**: slow steady growth in number. Less than 1% per year. 596,200 in 2019 from 596,000 in 2018.
* Growth in accession number is well past the major accumulation phase for most crops. The focus is now on filling gaps.
* Gaps now mostly of wild relatives. Most of the growth (request for wild relatives of crop plants) coming from demands from our **Genomics Colleagues**.
* **Distribution**: @ 250,000 per yr., double what it was in early 2003-2004. Dramatic increase from 04-08.
* Largest category of US recipients are faculty and students at land grant universities.
* International distributions represent 1/3 to ¼ of all activities.
* **Covid:** most international distribution has slowed down. No confidence in what is happening at the other end. Delivery service, work situation etc. is questionable.
* Here in the U.S., we are dealing with different regulations and directives from governors and local officials across different states.
* GRIN-Global functioning normally. Be patient.
* **Budget:** peaked at $47 million from 2010-2012, in 2013 budget took a big dive due to sequestration, crept up to around $44.6 million in 2019.
* Minor increase occurred in 2020.
* But the **purchasing power** of that dollar (using the research deflator) shows that we had more purchasing power before than we do now.
* We are distributing or getting more demand for accessions than we did before.
* **Key Challenges:** Some gene banks are now deciding what they will not do to cope with the situation.
* Exploring BMPs and procedures for managing accessions (and breeding stocks) with GE traits and the occurrence of adventitious presence (AP).
* Currently developing and applying cryopreservation and/or in vitro conservation methods for clonal germplasm. The in vitro techniques are far from ideal. Very costly in terms of personnel. Microbes are always a problem. Being able to devise something better is a key.
* The other sugar crop, sugar beets is nearly 100% RoundUp ready. For crops like this including alfalfa, soybean, corn, cotton, coming up with BMP in gene bank is **now** a priority. Before now all these crops were proprietary. Now these patents have expired, and we now have to manage them. They are difficult to manage.
* **Priorities:** Highest on top

|  |  |  |  |
| --- | --- | --- | --- |
| * Acquisition | * Maintenance | * Regeneration | * Documentation and Data management |
| * Characterization | * Evaluation | * Enhancement | * Research in support of the preceding priorities |

* Acquisitions must happen, or the germplasm is lost.
* Characterization, evaluation, enhancement should happen but if you are strapped for cash, it can wait.
* Research will permeate all the other activities to make them more effective and add value.
* **Personnel Changes**: Just like before, retired personnel not being replaced, but we are in the process of hiring, and training some new staff.
* Retirement recently. Jingho Hu, RL (ARS-Pullman).
* New Hires: Adam Mahan, Soybean Curator (ARS-Urbana).

Todd Rounsaville, Woody Landscape (ARS-USNA, Washington DC).

Cullen McGovern, IT Specialist (ARS-NLGRP, Fort Collinbs).

Alex Sanchez, transferred from ARS-SHRS Miami to ARS-NCGR, Davis.

* Open Slots: Hilo, HI; Pullman, WA; Corvallis, OR; Geneva, NY and Miami, FL. Hope to fill those now that the hiring freeze has been lifted.
* **Management Training Initiative**: A concern…….
* A third (1/3) of our staff to retire within the next 5 years.
* Currently no formal comprehensive training for new PGR managers.
* We are concerned with not only hiring but also training.
* ARS scientists ((G. Volk with ARS-Ft. Collins and P. Byrne of CSU-Ft. Collins) secured 2 grants.
* First grant was to convene a meeting to discuss how to recruit and train future practitioners in the field.
* A second more substantial grant from USDA/NIFA grant for a workshop at Ft. C. 24-26 April 2018 that discussed designing & developing a training program for PGR management to be delivered primarily through distance-learning, YouTube, then pursue a certificate course for folks who are hired. The workshop generated numerous insights.
* Workshop participants submitted a NIFA Higher Education Challenge grant proposal.
* Extensive survey for PGR training/learning needs published in Crop Science 59:2308-2316 (2019).
* E-book on conservation of wild relatives of crop germplasm also in the works.
* **Some good news**: We touched on this in 2019. Mostly targeted budget increases.
* Probably because of pressure groups got their congress representative involved, **Coffee genetic resources** ($1.9 million) for Hilo, HI; Mayagüez, collection backed up in PR; Ft. Collins, CO; Molecular genetics work in Beltsville, MD. **Citrus genetic resources** ($1 million) for Riverside, CA; other funds allocated to -Ft. Collins, CO. there, they have developed an effective preservation technique using cryo methods. **Industrial hemp genetic resources** ($500,000): Geneva, NY. Permits and licenses needed.
* More request for germplasm from home gardeners. Attempts to dissuade them from this since it is expensive and whatever we will provide them will not do well. We decline but we explain to them how our agency does benefit them.
* We now have a video to educate the public.
* Q & A…..
* Q..James Todd: What is the status on Cryopreservation on sugarcane?
* A..Currently not much success so far …as it is difficult. So presently preserved in tissue culture. Gail has worked on it for years without much success mainly because microbes in the tissues are difficult to get rid of. It is extremely costly and time consuming.

**Status of the World Collection at SHRS, Miami, Presented by Ricardo Goenaga, USDA-ARS, Miami, FL**

* **Project:** Sugarcane conservation is **part** of a project titled ‘Conservation, evaluation and distribution of sugarcane, mango, avocado and other subtropical and tropical genetic resources and associated data.
* Current project active till 2023. Lead Scientist position is Vacant (David Kuhn retired).
* In the process of hiring as soon as possible.
* Support personnel: 3 of 4 positions filled.
* **Species in collection:** number of species may seem to be in a state of flux but that is because staff are becoming more knowledgeable in classifying these species. *S. spontaneum* 294; *S. officinarum* 136; *S. robustum* 46; *S. sinense* 30; *S. barberi* 21 etc.
* M**aintenance:** About 1000 but final number will be certain after block rotation.
* Currently grown on 5 acres block with additional 5 acre for rotation.
* Drip irrigation plus sprinklers (used for cold protection)
* Last replanted in 2014.
* Plan to rototill and plant soybean (group 8) roundup ready variety with no patent.
* New personnel anticipated: plan to continue work on characterizing the collection.
* Aphis permit renewed in June 2019.
* **Distribution:** from Jan 2019… Total of 130 distributions.
* *S. barberi* (6), *S. Spontaneum* (36), *S. officinarum* (49), *S. robustum* (12), S. sinense (7), *S. edule* (2) etc.
* **Issues and Solutions**:
  + Hurricane Irma. Greenhouse damaged, congress appropriated funds available, Designed and building of state-of-the-art facility will start soon.
  + **Vacancies:** Numerous vacancies, hiring freeze + closure list in last couple of years.
  + Khun retired, 100% molecular biologist; Ayala, 70% curator, Cat.4 hire, Tech position to assist curator. No longer on closure list.
  + 12 positions to be filled. So far hired 7.
* **Mislabeling**: Visit of expert (Tom Tew did not happen - Covid). Collaborating with Angelique D’Hont (CIRAD, France) by supplying lyophilized leaf samples for fingerprinting. Reported several clones with the same name obtained from different collections around the world have different molecular profiles.
* **Recovery of lost germplasm**: Brazil (Luciana Pinto of Instituto Agronomico de Campinas, Sao Paulo willing to **send back** germplasm-will go through quarantine.
* Trip to Brazil was unrealized due to Covid. Still working on the project for next year.
* USDA-ARS, Ft Collins provided 27 of such lost accessions from backup collection stored in liquid nitrogen, in vitro (cryopreservation) preservation-40-90% viability. Plants now in pots.
* **Pandemic:**
* Period used to do other productive work. E.g., Characterizing inflorescence of accessions
* Q & A…….
* Jack: You mentioned new species of *Saccharum*?
* Ricardo: No, these are materials that were already in the collection but never reported or classified.

**Amendment to 2019 minutes: Jim motioned that, ‘The committee chair will communicate, with past recipients of germplasm considered missing from the collection, the important of the integrity of the collection and request a reciprocal return of the accession where possible’**

* Jim opined that the motion may not be relevant anymore given what we just learnt from Ricardo’s presentation that, Brazil is ready to comply with our request for return of missing material.
* Herman: moved motion to approve the 2019 minutes. Charley: seconded. Motion carried. 2019 CGC minutes accepted as presented.

**Discussion of importation of non-stalk material from foreign sources.** **Discussion led by Charley Richard, C. Richard and Associates, LLC., New Orleans, LA and Chris Laborde, U.S. Sugar Corp.**

* Charley: We have agreed we can import material other than clonal material, e.g., fuzz or seed.
* What could we do with the quarantine program to maintain the level of safety, as in the past, to protect the industry?
* Charley then presented a scenario different from seed (fuzz).
* If we provide ‘Foundation seed’ (as our cleanest material) to a foreign lab, and this foundation seed never leaves the lab or quarantine facility, is never planted into a soil and is returned as plantlets (in a medium), is there or should there be a difference in quarantine requirements?
* Chris: restated the question….are you implying you want to send material out of the country for tissue culture?
* Charley: no, we want to send a limited amount of material and get it back with inserted genes. Can the quarantine program be improved so this type of material does not spend as much time as regular imports?
* Jim: restated the questions again.. Is there any way we could improve the quarantine program so this type of material does not spend a lot of time as it does now?
* Mike Irey: could this be done by an MOU with the outside entity which restricts the conditions under which the material is handled? Citrus does that with interstate exchange and it works.
* Jim: Is Aphis amenable to that?
* Mike Grisham: If you work with them and put in the right things and there is verification that those things are being done then it is doable … things such as isolation, documentation, no intermingling, dedicated equipment …they probably will work with you.
* Jeff: typing in the chat. Says LA has done this twice.
* Ricardo: tissue culture can help but with the number of viruses involved those things will be tested.
* Mike: You are returning the same material back after the transformation
* Ricardo: then that is possible and has been done with bananas.
* Chris: keep it relatively small..a small number of plantlets could be possible.
* Mike: with transgenic you don’t’ get a whole lot back. And it also depends on the lab. A country where no sugarcane is grown is possibly the best way to go.
* Collins: Coming from a foundation seed the U.S. lab will confirm the absence of disease first before sending it out.
* Jeff: it is doable and should be handled on a case-by-case basis. No one size fits all.
* Jim: as technology improves, we keep finding more viruses.
* Jack: there is no defined rules for importing tissue cultured plantlet from foreign countries. That is interesting but it is different from bringing back plants that have been genetically modified. We need to work with Aphis.
* Chris: talking from his experience …in past talks with Dr. Foster … Aphis wanted the material to go to Maryland but in this situation, we might want to treat this as seed where the material goes directly to local Quarantine instead of to Maryland.
* Mike Irey: there is a difference…we are not importing new varieties. It is not bringing in a foreign variety. From what Charley presented the questions is how do we transform and send the same thing back to you?
* Chris: we need a phytosanitary certificate before we send it off. There has to be a trust factor that they will use the same material.
* Collins: And follow APHIS protocols strictly. We (LSU) sent material to the UK. No sugarcane grown in the UK. Jeff handled the phytosanitary certification. When the materials came back, we planted them directly to the field.
* Kenneth: the material was grown in the greenhouse; APHIS came out to inspect and there was some disease testing involved.
* Jim: citing Jeff’s text… there is no action required by this committee. Everything was worked out before it was done through APHIS.
* Collins: what would happen to the material after it comes back? Are we privy to information gleaned from such an exercise?
* Charley: there is a proposal being offered. It is done with a country that does have sugarcane. .. which might not make it easy.. The proposal probably won’t go forward if the material that comes back has to go through the current full quarantine process. It will be too restrictive but if we find a way to make this more palatable then the proposal might go through.
* Mike Irey: it was a multi-step process that we went through to get APHIS to allow seed (FUZZ) to be imported. The industry has to work through APHIS to initiate the process and answer all their concerns. Everything can be handled through compliance agreements.
* Collins: from what I can gather, you have the blessing from the sugarcane community to initiate the process with APHIS.
* Jim: a key difference with the seed is that we were working with a change of philosophy to establish a **routine importation process**. This is not. This looks like something that would involve a case-by-case compliance agreement type of situation. The mechanisms are in place to do what is desired. It just needs to be done through an agreement process. Jeff has done it we need to hear from him.
* Jeff: ON Phone… the process was challenging. Clarissa was helpful. Our material went out to a self-contained lab. They agreed to the procedure we had put together .. they (AHPIS) checked the material on the way in. It came back and we planted it.
* Charley: agreed with Jim that we do not need action from this committee.
* Anna: unfortunately, no one from APHIS is online today. The position for our APHIS contact has yet to be filled.
* Jim: we need to include it in the agenda of the expectation of someone from AHIS to participate.
* Gary: not sure when the person will be replaced.
* Collins: asked if Charley was doing this for the sugarcane community or if he is representing an unnamed entity. Will we have access to the material?
* Charley: I am just the mediator .. it will be an expensive process and it will be a proposal between an industry and a lab which is part of a university in a foreign country.
* Charley: will something from this CGC to APHIS stating that this was discussed and there was no opposition be helpful?
* Anna: not sure about the mechanism. May not be able to write a letter of support.
* Collins: I think Charley can approach Aphis by himself. Just like we handled it at LSU Charley can then cite this discussion (we are not opposed to it) and precedence (LSU).
* Charley: I am not a part of this proposal. It is between the lab and an industry.
* Michael Grisham: endorsing something like this is not a function of this committee. But we have precedence that could be cited. It is not a policy change. We are not talking about a specific policy either.
* Collins: this is different from a tissue culture example. Whatever is coming back has an insertion. APHIS would like to track it when it comes back. APHIS would like to know how you are going to handle the material when it comes back such that unintentional outcrossing does not occur. What ever guidelines you provide should include how you will handle the material to avoid unintended/ unforeseen consequences.
* Mike Irey; with transgenic there might be more than one agency involved. APHIS, BRS depending on what it is may have EPA. Its not going to be straight forward. It is going to be a situation where you propose what you intend to do, and they say no you can’t because of one or multiple reason(s) and you come back with an alternative proposal to satisfy those conditions until there is satisfactory solution for all concerned.
* Chris: with the GMO aspect all kinds of permits will be involved.
* Collins: CGC came together to work towards a method for importing seed. CGC as a community did the research that led us to OK importation of seed. The seed was meant for only one entity. Why are we not coming together to assist in Charley’s proposal?
* Jim/ Jack: disagreed. And stated that the two situations are different.
* Jim: we were trying to change the whole philosophy with APHIS.
* Mike Irey: It was a prohibited item. Now everyone can do it if they follow those steps.
* Jim: that was an effort for all by all.
* Mike Grisham: quarantine regulation had been in place for more than 25 years. APHIS procedures had to be updated. What Charley is talking about is new technology that was not available 15 years ago. We have settled on the fact that it can be done and whoever is doing it can work directly with the regulatory agencies. The agencies are there to serve us. If you present a proposal that achieves their goals, they are going to work with you.
* Anna: summarized the discussion…. we have agreed that in this instance they (charley et al.) need to move on, on their own.

**Nomination of Committee Members and Officers**

* Collins: we decided in the last meeting to hold Tomas’ position open until his replacement is hired.
* Jeff: motion to nominate Niranjan Baisakh as a molecular person on the committee.
* Kenneth: made the verbal motion since Jeff was having difficulties getting online.
* Herman; seconded.
* Anna: tabled to motion to the committee and it passed.
* Jack: the industry should encourage the replacement for Martha’s old position.
* Herman: revealed that he is working on a letter to Dr. Joe Foster.
* Jack: he (Dr. Foster) is probably working on it but a letter from industry stakeholders will be helpful.

**Chair Dr. Anna Hale opened the floor for discussion.**

* Aliyah: we have germplasm being maintained at Canal point and Miami. It is expensive. How can we coordinate the effort? Based on information she received from Anna she contended that the present set up was OK.
* Anna: wanted to know why Peter kept mentioning Hilo as an option for a secondary collection site for sugarcane.
* Tim: it has come up before but there is no curator in Hilo. But it is one of the sites that has the right conditions for it but there is no intention to do that right away.
* Ricardo: said he knew nothing about it.
* Anna: Hilo was mentioned as an option before.
* Niranjan: thanked everyone for his nomination.
* Anna: asked for a motion to adjourn the meeting but Collins reminded the group that Dimitri had a pathology update to give.

**Pathology update: presented by Dimitre**

* Mosaic sequences. Collaborating with Mike Grisham (LA) and Phillip Rott (Florida).
* Of 20 sequences from **Louisiana** most were of **sorghum mosaic virus** and very few were sugarcane mosaic virus.
* In **Florida**, most were **sugarcane mosaic virus**.
* In Florida found 8 different host species.
* **Sugarcane yellow leaf virus:** new antibodies developed and being tested in collaboration with Phillip.
* Ones developed by Walker outdated and inconsistent. Many discrepancies found.
* **New virus found on Miscanthus:** clone imported from Asia
* Routine tests failed to find this virus
* Yellow flec on leaf. We are calling it yellow flec virus from now.
* Martha ran her own sequences, and they match with what I found.
* It’s a polero virus similar to yellow leaf.
* Interesting because *Miscanthus* is used as a source of genes for resistance to SYLV to breed sugarcane.
* Found 7 open reading frames. 5 like SYLV and 2 like a virus in wheat.
* Exploring insect transmission to see if the vector that transmits this virus is present locally.
* Inserted gene in potato virus X-vector and used that to transform tobacco. The coat protein sequence was expressed meaning it is a functional virus.
* Using this work to impress on APHIS the value of high through put technology.
* Jack: what’s the host range of this virus? Can it attack other grasses?
* Dimitri: it probably can. A renowned virologists Rose Hammond has concurred with my findings, so I am confident we have a new virus. Added problems for our industry but it is good to be prepared.
* Dimitri: I am not allowed to do insect transmission work. Collaborating with others.
* Collins: is it a new virus because it has existed before, and it is just now being discovered or is it new because it just recently came into existence?
* Dimitri: difficult to say without further studies but guess it has been in existence for a long time and has just been discovered. Probably deviated from SYLV a long time ago. I said New instead of Novel. Novel will mean a new recombinant.
* Jack: Is the push for the adoption of high through put technology that Martha was making still resonating in APHIS.
* Dimitri: we are trying to use this study to convince policy makers at APHIS to invest in this direction. The international community is also moving towards that direction.
* Collins: is the virus easily identified or visible does one need PCR technology before one would even know the plant was carrying the virus?
* Dimitri: there are symptoms, but not clearly visible. Narrow leaves also complicate things. Will like to receive samples to see what we can find.
* Ricardo: will send samples.
* Niranjan: what are the primers targeting?
* Dimitri: conserved regions but would have to widen the regions (I think alluding to the viral genome. While developing the primers) so nothing is missed. Will use pulled samples (I think alluding to DNA extracted from sugarcane) which can be helpful, so nothing (I think alluding to presence of virus) is missed.
* Niranjan: what is the genome size of this virus.
* Dimitri: about 6000bp .. Dimitri warned that some sequences in the gene bank and not properly annotated.
* Anna: called for anymore discussions? With none she asked for a motion to adjourn the meeting
* Mike Grisham: moved a motion to adjourn the meeting. Seconded by Aliya.
* Meeting was adjourned by Chair Dr. Anna Hale at 11:05 am.

Respectfully Submitted by,

Collins Kimbeng