**Small Fruit Crop Germplasm Committee** **Minutes**

Wednesday 28 Oct 2020 from 11:00 pm EDST Zoom meeting https://ncsu.zoom.us/j/99593937973?pwd=S2NsT1pRc2FWRFdDb3J3RXV5Y1lYdz09

1. CGC Administrative
   1. Attendance taken by Kim Lewers (USDA Beltsville).
      1. Committee members present
         1. Kim Lewers - Chair
         2. Barbara Smith
         3. Beatrice Amyotte
         4. Courtney Weber
         5. Hamid Ashrafi
         6. Juan Zalapa
         7. Kyle VandenLangenberg
         8. Lise L Mahoney
         9. Margaret Worthington
         10. Mark Ehlenfeldt
         11. Massimo Iorizzo
         12. Michael Dossett
         13. Patrick Edger
         14. Penelope Perkins-Veazie
         15. Vance Whitaker
         16. James Olmstead
      2. Committee members absent
         1. Nicholi Vorsa
         2. Pat Moore (retired)
         3. Phil Stewart
      3. NCGR ex-officio members present
         1. Kim Hummer - RL
         2. Jill Bushakra
         3. Nahla Bassil
      4. NGRL representatives present
         1. Gary Kinard - RL
         2. Dimitre Mollov
         3. Melanie Schori
      5. NPS representatives present
         1. Tim Rinehart
         2. Jack Okamuro
      6. Guests present
         1. Mark Hoffman - host
         2. Gina Fernandez - host
         3. Ava Wait
         4. Eric Gerbrandt
         5. Eric Stafne
         6. Harlene Hatterman-Valenti
         7. Iaonnis (Yannis) Tzanetakis
         8. Jessica Spencer
         9. Jim Luby
         10. Katie Sheehan-Lust
         11. Michael Alan Hardigan
         12. Mitchell Schumann
         13. Sunny Green
         14. Wendy Hoashi-Erhardt
   2. Minutes taken by Jill Bushakra (USDA Corvallis).
   3. Kim L. directs us to the website: <https://www.ars-grin.gov/npgs/cgclist.html#Small> for all documents and reminds us to update our membership information
   4. All members who were on the call and who are up for renewal agreed to be put forward for re-election for a new 3-year term, and Kim L. agreed to run for Chair. Pat Moore (retired WSU) declined to run again as a member. Jim Olmstead (Driscoll Strawberry Assoc.) contacted Phil Stewart (Driscolls), who emailed Kim L. during the meeting to decline his place on the ballot and to suggest another willing Driscolls employee in his stead, Deb Menicos.
   5. Next meeting: Since the Federal Government has not yet approved a budget, we cannot put out a call for proposals. Kim L. suggests having 2 short meetings, one in early spring (late-March) and one in conjunction with the NCCC-212 meeting in October. This will allow for more timely review of materials for proposal and to divide up the agenda items. All agreed.
      1. Several pathology issues came up during the discussion of the Evaluation Research Priority List:
         1. Vance Whitaker (UF): UF has a new extension publication by Natalia Peres on neopestalotiopsis in strawberry. Gina Fernandez (NCSU) says she has seen this pathogen on Rubus in two disjunct locations in NC. It also has been reported in New Jersey, but the source was plant material originating in North Carolina.
         2. Michael Dossett (BC Blueberry): Strawberry blossom weevil is a new Rubus and rose pest in the Fraser Valley. He found it in about 40% of flower buds in roadside Himalayan blackberry.
         3. Yannis Tzanetakis (U Ark) reports on a new carlavirus in blueberry that is related to blueberry scorch. Some cultivars are asymptomatic (tolerant), others express symptoms.
         4. Yannis reports on a new luteovirus in blueberry that is related to and correlated with blueberry shock.
         5. Yannis reports on 2 new presumably aphid-borne strawberry viruses.
         6. Yannis discussed some issues with Rubus Yellow Net Virus (RYNV). He says that the virus has become integrated into the Rubus genome in the same location in many cultivars. PCR tests reveal the presence of the virus even though it is inactive. PCR + another test (rtPCR, etc.) is needed to determine integrated vs. active virus. RYNV does not affect the crop but can limit export of material to foreign countries. He is working on determining when the virus was incorporated into the genome, but suspects it was in the early 1900s. He thinks there are 10 integration sites. He will work on a publication to educate importers on which strains are the integrated virus DNA and which are active pathogens. He thanks Kim H. and Jill B. for providing material from the repository for analysis.
         7. Mark Hoffman (NCSU) mentioned he is working with other East Coast pathologists on fungicides (Thiram and Switch) to manage *Neopestalotiopsis*, an emerging disease of strawberry.
         8. Kim L. found *Colletotrichum siamense*, a member of the *C. gloeosporioides* complex, in her strawberry fields in Maryland. She is finding resistance in her breeding population. Vance W. worked with Jeremy Pattison to screen germplasm from UF, UC and NC. Gina F. screened her material. Kim Hummer (USDA Corvallis) suggests that any material not currently held at the repository be contributed and for material already held please provide evaluation data for entry into GRIN-Global. Vance mentioned that the Peruvian *F. chiloensis* super core has resistance. Kim L. says that the repository ‘Pelican’ is infected with Strawberry Yellow Edge Virus and has clean material she will share once the repository facilities have been upgraded.
         9. Kyle Vandenlangenberg (California Berry Cultivars) is noting that 30-40% of acreage in Northern California strawberry growing fields is infected with Fusarium. These are fields primarily treated with PIC. Fusarium does not appear to be in the nursery fields. Michael D. says there are molecular markers for resistance. Vance W. says that Steve Knapp (UCD) is continuing to screen for sources of resistance in Eastern germplasm.
      2. Kim L. reported that Germplasm Evaluation proposals have been suggested for blueberry, strawberry, and Rubus.
2. At-risk small fruits breeding programs:
   1. Gina F. (NCSU) says that the NCSU Rubus breeding population is at risk as she is no longer making crosses and is just trying finish evaluating material she has. She is focused mainly on strawberry now as she can’t compete with U Ark for blackberries or Driscoll’s for raspberries. There is a niche market for red raspberries, but she has no industry support. Margaret Worthington (U Ark) suggests a breeding agreement for blackberry.
   2. Jessica Spencer (NCSU) says that their muscadine grape breeding population is vulnerable. She will contact the CGC for that crop.
   3. Wendy Hoashi-Erhardt (WSU) is concerned about their strawberry breeding germplasm, as the Washington Strawberry Commission disbanded three years ago. WSU is planning on filling the position of raspberry breeder as the Washington Red Raspberry Commission has funded an endowed chair, but the timeline for hiring and the state budget are uncertain, and there has been a decline in industry support. She suspects that the position will move to a new location and that during that time the breeding germplasm may need to be thinned. Kim H. requests to be kept informed so the repository can make plans to receive material. Michael D. has room to receive material. Kim L. reminds us all that the CGC’s role is to rescue breeding selections at risk, and to make sure supervisors know of its existence and aims.
3. Crop Vulnerability Statements and “Quad Charts”
   1. Kim L. reminds us that the CVSs are for the “vulnerability of the crops in the field”. She also reminds us that each of the CVSs needs a section on the current breeding programs for the crops, as it is through breeding that the germplasm can address any vulnerabilities of the crops in the field. Only the strawberry CVS has a breeding program section which can be used as an example for the other CVSs. All crops have recent statements on file on the website or published. Kim L. reminded us that the CVSs need to be no more than five years old to maintain our CGC eligibility for funding. The oldest CVS is the one on Rubus, which currently contains both blackberry and raspberry. The CGC agreed to split the Rubus CVSs into a raspberry CVS and a blackberry CVS. The Rubus CVS was split in two, because raspberry and blackberry are two very different crops grown in different climates and geographic areas, (though they overlap in some regions), and have different vulnerabilities in the field, and the germplasm collections are separate, managed differently, and do not overlap for all practical purposes. Michael D. is working on the raspberry CVS, and Margaret W. is working on blackberry CVS. The goal is to have these two CVS 90% complete by March 2021 and finished by October 2021. Nahla Bassil (USDA Corvallis) suggests modeling the Rubus statements after the apple statement published in Genetic Resources and Crop Evolution and to try to include the new breeder in the statement. Michael D. suggest the pecan statement published in HortScience as a model. Kim L. reminds us to follow the template, but it can be polished for publication in a peer reviewed journal.
   2. Ribes: no current US breeders. The only active breeder in North America seems to be Dick McGinnis in BC. Jill B. has attempted to contact him several times and has not received a reply.
4. CGC germplasm evaluation grant progress reports
   1. Hummer (2019) “Phenotyping diverse strawberry cultivars”: Kim H. summarized her findings on the 287 cultivars and selections she evaluated for 2019 and 2020 for 17 phenotypic descriptors. Phenotypic, genotypic and statistical data for 2019, 2020 and the best linear unbiased estimate (BLUE) will be loaded to GRIN-global. Fruit was sent to Linus Pauling Inst. at Oregon State for anthocyanin analysis; TA and SS to be done at NCGR when time allows. Seed was extracted from 270 cultivars and an aliquot sent to USDA NRGLP for back up. Plants were sent to Beatrice Amyotte (Agriculture and Agri-Food Canada, Nova Scotia) for evaluation. Beatrice A. says the plants are in the ground and that she will likely need some replacements. This *Fragaria* x*ananassa* material was selected for evaluation as part of a Small Fruits CGC grant to Cal Poly (Kelly Ivors, lead) to evaluate the repository collection for resistance to soil-borne fungal pathogens. After two years working on the project and a request for duplicate plants of some of the accessions, Kelly Ivors left Cal Poly to work at Driscolls, and the project ended. Steve Knapp expressed an interest in the same germplasm. The repository staff propagated the material, but Steve was unable to proceed. Kim H. submitted a proposal to put the propagated material to good use and received CGC funding. Included in this set are heritage cultivars and breeding lines from 17 countries and 19 US States. Steve Knapp and his team (including Michael Hardigan) included some of these cultivars to reconstruct the social network of the genealogy of the strawberry from the mid-1700s to the present. Kim H. will link to her PowerPoint presentation and make the slides available that she was not able to share. She also prepared and submitted a word summary of her results thus far.
   2. Bassil, Zurn, Mahaffee, and Dossett (2018): “Characterizing Resistance to Powdery Mildew in Red Raspberry”: Michael D. summarized the findings of 2 functional MLO genes and an incomplete copy. MLO genes confer complete, multi-species resistance through recessive alleles, which can have any number of non-functional sequences. Future work will be to perform RNA-seq on infected plants, make crosses and self-pollinations to clarify the non-synonymous substitutions, improve the phenotypic screen, and perhaps use EMS mutagenesis.
   3. Bassil (2017): “Assessing genetic diversity in the cultivated strawberry (*Fragaria* ×*ananassa*) collection at the National Clonal Germplasm Repository”: Nahla B. requested suggestions on criteria to use and a process to develop with the CGC and experts for each crop for constructing core collections using molecular data as these data are becoming available for many of our collections. Please contact her and the CGC chair to set up a meeting if necessary. Michael Hardigan (USDA HCRU) spoke briefly on the work he did at UC-Davis using data from this study to look at octoploid strawberry domestication (a companion paper to that of Pincot et al., available on bioRxiv at <https://www.biorxiv.org/content/10.1101/2020.09.30.320689v1.full> ). They used the data (and from an additional 1000 accessions) to describe the genomic history of strawberry domestication from the earliest hybrids to the current modern cultivars.
   4. Stringer, Sampson (2014, 2016): “Screening Small Fruit Germplasm for Resistance to Southern Populations of Invasive Spotted Wing Drosophila, SWD (Diptera: Drosophilidae)” The manuscript was accepted for publication in the Journal of Economic Entomology: no presentation on this.
5. National Reports
   1. Tim Rinehart (National Program Leader USDA Beltsville) and Jack Okamuro (National Program Leader USDA Beltsville) congratulate us on our productivity. Tim mentioned some recent staffing changes highlighted in his report and that he can help us contact the appropriate people. Kim H. thanks Tim for his support in getting a base funding increase of $150K for the repository from the blueberry commission and for his work to get our facilities replaced. Tim R. mentioned a ground-breaking in WI on a new facility.
   2. Gary Kinard (NGRL Beltsville)
      1. Plant Exploration proposals are being considered in spite of the COVID19 pandemic, but they are limited to domestic travel. Five proposals have been submitted for funding for FY 2021. Deadline for FY 2021 proposals has passed but they are continuing to accept proposals. Proposals can be funded and extended for a total of 5 years to allow for pre-travel reconnaissance and documentation. Four domestic plant exploration trips were approved for FY 2020.
      2. GRIN-Global public website was updated in July, and a new version in August to fix July bugs. Next big change will come in Dec/Jan to the taxonomy searches.
      3. Gary K. mentioned a paper by Juan Zalapa on cranberry genetic diversity.
      4. He commends us on our Small Fruits CGC productivity and activity.
   3. Kim H. (NCGR Corvallis)
      1. Reports on the number of staffing changes. NCGR is in the process of recruiting to replace Joseph Postman as tree curator; Jeanine DeNoma retired so recruiting will begin to fill that technical position; Missy Fix retires in April so that position will need to be filled. Two new field staff were hired, a seasonal and a 4-year term. NCGR needs to get its new staff access to GRIN to update inventories, so Kim H. asks Gary K. to help get that moving. Kim H. is working with Melanie Schori (USDA Beltsville) on updating and improving the taxonomy of the collections.
6. Ran out of time so there was no work done on the Vaccinium Vulnerability Statement
7. Meeting adjourned 10:05 PDT

Respectfully submitted,

Jill Bushakra