**MINUTES OF ANNUAL MEETING**

**W4168 Multi-state Research Project**

**University of Kentucky, Lexington, KY**

**October 11-12, 2019**

Meeting information and agenda: <https://www.nimss.org/meetings/51638>

**Friday, 11 October 2019**

Present (by state/agency)

AZ, Ramin Yadegari (U. Arizona)

FL, Hector Perez (U. Florida)

IA, Susana Goggi (Iowa State U.)

KY, Robert Geneve, Bruce Downie and Tomokazu Kawashima (U. Kentucky)

MO, Jessica Torrion (Montana State U.)

NY, Alan Taylor (Cornell U.)

OR, Sabry Elias (Oregon State U.)

SD, Xingyou Gu (South Dakota State U.)

TX, Daniel Leskovar (Texas A&M U.)

Advisor, Paul Johnson (Utah State U.)

Call meeting to order at 8:30 am. Welcome and introductory remarks by Robert Geneve and Robert Houtz (Associate Dean for Research, U. Kentucky College of Agriculture, Food and Environment).

Chairperson Sabry Elias called meeting to order. No NIFA representative present. Motion to approve last meetings minutes was seconded and the minutes were approved. The writing committee were thanked for their efforts. Approval of the new W4168 Project proposal has been received from NIFA. The two new objectives of the project were discussed. Annual Report of the project activities (that encompass the last year of the old W3168 Project is due 60 days from today. New members of the W4168 Project, Jessica Torrion (Montana State U.) and Tomo Kawashima (U. Kentucky) were welcomed. The meeting agenda was summarized.

Paul Johnson (Program Advisor, Utah State U.) thanked the working-group members for their continued work and submission of reports on time, emphasized the importance of good impact statements and providing photos and stories for public to understand and appreciate the work.

Group discussed that there will be no NIFA representative at this meeting, and the process of creating the new project/renewal 4168 was assessed as being carried out rather smoothly, thanks to the key members.

Discussion of how to recruit new members. Jessica Torrion and Ramin Yadegari commented.

Reminder to all that annual report is due 60 days after this meeting.

Break

Reports of Research Activities:

Susan Goggi (Iowa State U.): Extensive outreach work including production of a video on seed diversity mainly through efforts of Manjit Misra (Iowa State U.); [www.seeds.iostate.edu](http://www.seeds.iostate.edu). Discussed current educational efforts online including delivering a master-degree program on Seed Technology and Business (STB) with 50-55 students. Reported on three main projects at Iowa State including (1) genome fluidity, (2) phages as bio-based seed treatments and (3) soybean seed composition changes under stress. Provided some info on a new project initiated for W4168 that addresses seed characteristics for successful emergence under ground cover. Will be on sabbatical during spring 2020.

Tomo Kawashima (U. Kentucky): Research focused on regulation of early seed development including projects on (1) F-actin function during fertilization and early endosperm development affecting seed size in Arabidopsis, (2) factors affecting F-actin structure, and (3) effect of heat stress on early endosperm and seed development in soybean.

Ramin Yadegari (U. Arizona): Reported on continued efforts to understand the regulatory processes that drive proper endosperm development in maize with a recent focus on understanding the effect of post-fertilization application of drought stress on endosperm and seed development in maize.

Bruce Downie (U. Kentucky): The experiments utilized to understand aspects of the natural protection mechanism active in plant orthodox seeds was presented. The presentation focused on the seed proteome and how protective proteins (LATE EMBRYOGENESIS ABUNDANT PROTEINs; LEAP) and carbohydrates (Raffinose Family Oligosaccharides, RFOs) have influence protecting a desiccation sensitive proteome from permanent denaturation. The significance of protecting those proteins involved in translation above all others in the desiccating cell, a model embodied in Job’s rule, was presented.

Xingyou Gu (South Dakota State U.): Reported on three major areas of research associated with understanding seed longevity and dormancy in rice. (1) Seedbank longevity of cultivated and weedy rice, (2) molecular and genetic characterization of SD12s-identified locus including understanding the encoded TF protein function and its interacting proteins, its downstream target genes, and how it confers resistance to pre-harvest sprouting in rice, and (3) a new project that is focused on understanding a transgenerational patterns of epigenetic inheritance for seed dormancy associated with qSD12 in rice.

Formal meeting adjourned at 11 am for lunch and afternoon tours of the Lexington seed lab and local hemp fields. See the meeting agenda for details.

**Saturday, 12 October 2019**

Call meeting to order at 9:09 am.

A discussion on the future of the W4168 program and how to recruit new member initiated by Elias:

Perez and Johnson emphasized that our research needs to be collaborative and multi-state, cooperative as required by NIFA. Elias pointed out potential inherent limitations on collaborations among the participants as there are either basic researchers or applied ones participating. Leskovar added that the research output presented at the meeting is not a reflection of collaborations, rather individual labs or stations. Geneve indicated that the program only has 13 participants.

Geneve suggested to consider a strategy to change emphasis or come up with new members who can cooperate more readily as effective cooperative research can bring in funding. Downie pointed to an effort in Kentucky to put together a consortium on seed biology to influence government funding. Taylor suggested that he has been working with a similar effort in New York. Geneve reminded the group that one of the goals of the program is to train the next generation of seed biologists for industry, and that we should outreach to industry for funding. Elias volunteered to draft a letter to industry consortia.

Leskovar suggested setting up a website to provide info the W4168 program as major means of outreach. Discussion of the importance of seed biology to agricultural yield. Geneve suggested faculty development and recruitment would be another aspect of our work as seed research does not translate to participation in the working group for many workers out there. A website will be an important tool. Target groups include the C4 Division of CSSA and members of ASHS. Yadegari offered that such outlet will help identify/attract new recruits or collaborators. Elias, Yadegari, Gu and Geneve suggested an ad hoc committee to take on the task of developing a website that is updated regularly. Yadegari, Kawashima, Torrion and Gu agreed to form the committee.

Geneve brought up the need to consider succession of officers for the working group to facilitate its activities, with Secretary rotating into Chair position, each in two-year cycles. Suggests Yadegari as Chair after next meeting, Torrion agreed to be the Secretary. The group asuggested Welbaum (not present as Vice-Chair).

Discussion of next meeting time and location. Geneve suggested Tucson after the CSSA meeting to be held in Phoenix during November 8-11, 2020. Yadegari agreed to organize it.

Continuation of Reports of Research Activities:

Alan Taylor (Cornell U.): Reported on key efforts associated with increasing hemp seed germination frequency and consistency using seed treatments and coatings. Also reported on recent efforts to understand changes occurring during hemp seed germination using CT scan.

Daniel Leskovar (Texas A&M U.): Reported on (1) the use of selective organic media containing humic substances to increase transplant quality traits under drought and heat stress conditions, (2) determining the best scion/rootstock combinations for grafting tomatoes based for yield and quality under Texas growth conditions, and (3) determining best conditions for tomato pollen fitness under coulture conditions to apply to the field conditions.

Sabry Elias (Oregon State U.): Reported on efforts to standardize determination of seed and seedling vigor in hemp, including vigor measurements of seeds taken from different parts of the plants and under various conditions of cultivation and environment.

Hector Perez (U. Florida): Reported on research focus on (1) identification of environmental parameters to acheive maximum germination for seeds of federally listed endangered plants as Linum species, and (2) analysis of changes in seed quality from populations of Uniola occurring across a latitudinal gradient using respirometry and multi-spectral imaging technologies.

Robert Geneve (U. Kentucky): Reported on analysis of Cannabis sativa germination rates under optimal and under thermal inhibition. Also reported on efforts to develop methodologies for priming of hemp seeds.

Meeting adjourned at ~1 pm.