



Solanaceae Coordinated Agricultural Project

SolCAP Solanaceae Coordinated Agricultural Advisory Board Meeting

January 9, 2010	10:15AM – 11AM Closed Door	Town and Country Resort, San Diego, CA
Meeting	2 nd Annual SolCAP Advisory Board Meeting	
Leader	Dr. Glenn Bryan	
Attendees	Glenn Bryan, SCRI Scotland	
	David B. Neale, UC Davis	
	Deana Namuth Covert, University of Nebraska-Lincoln	
	Debby Lewis, Ohio State Univ.	
	Charles J. Rivara, California Tomato Research Institute	
	Michael Coe, Cedar Lake Research Group, SolCAP Assessment	
	Carl Braun, Monsanto (replaces Thomas Osborn)	
	James Giovannoni, Boyce Thompson Institute for Plant Research	
	Rene Klein Lankhorst, EuSOL (replaces Dani Zamir)	
	Lynn Senior, Syngenta (substituting for Eric Legg)	
Not Able to Attend	Caius Rommens, Simplot Company	
	Bob Hoopes, Frito Lay	

SolCAP Advisory Board Discussion with SolCAP Executive Committee and Participants

11AM (Open Session)	Presenter: Glenn Bryan	
Attendees	Advisory Board (listed above)	
	David Douches, MSU	
	Robin Buell, MSU	
	Allen Van Deynze, UC Davis	
	David Francis, Ohio State Univ.	
	Alexandra Stone, Oregon State Univ.	
	Lucas Mueller, Cornell Univ.	
	Walter De Jong, Cornell Univ.	
	Ed Kaleikau, NIFA-USDA	
	Kelly Zarka, MSU	
	Joyce Van Eck, BTI Cornell University	
	Jay Scott, Univ. Florida	
	John McQueen, Oregon State Univ.	
	Hank Verbakel, Nunhems, a subsidiary of Bayer CropScience, Netherlands	
	Kent McCue, USDA/ARS	
	Barbara Liedl, West Virginia State Univ.	

SolCAP Advisory Board Discussion with SolCAP Executive Committee and Participants	
Attendees	Nankui Tong, Campbell's
	Mark Van Haaren, Netherlands
	Richard Veilleux, Virginia Tech
	Roger Leigh, Portland Oregon
	Sam Hutton, University of Florida
	Xiangyang Zheng
	Matthew Robbins, Ohio State Univ.
	Matthew Kinkade, Penn State
	John Lindbo, Campbell's Seeds
	Ann Marie Thro, USDA
	Gera Jocham, NIFA, USDA
	Cholani Weebadde, MSU RosBreed

SolCAP Advisory Board Discussion with SolCAP Executive Committee and Participants

Discussion A (Research related)

The Advisory Board noted that the SolCAP Team has made rapid progress in the past year. There has been an impressive amount of work completed which included generation of a great deal of sequencing data.

Conclusions

The group agreed that the research is going well and the data is of excellent quality. The board does not have any concerns about the science.

Discussion B (Research related)

The Advisory Board asked whether there had been sufficient input from industry professionals (particularly tomato) in choosing the 480 lines for initial genotyping.

Conclusions

Two years before the starting date of SolCAP discussions were initiated regarding the make-up of germplasm panels. These discussions occurred formally in stakeholder workshops (UC Davis and TBRT, Florida). At that time everyone agreed that SolCAP would like to have the tomato industry contribute lines for genotyping. However, the issue of making the data on those lines public proved to be a barrier. SolCAP is a public program and has made an effort to include commercial relevant lines in the selection. For example, there are lines from all public tomato programs; lines of commercial relevance developed by David Francis (Co-Director), Jay Scott (Univ. Florida) and Randy Gardner (retired, NC State); and lines derived from repeated selfing of commercial hybrids. Conversations with Seminis and Syngenta indicated that they would be interested in and would make use of the information derived from these lines.

Discussion C (Research related)

The Advisory Board had concerns as to whether there will be enough useful SNPs in commercially relevant tomato germplasm and whether we have a good idea of what would be enough.

Conclusions

Matt Robbins (OSU) has run a pilot project that examined Linkage Disequilibrium (LD). A paper is in internal review describing about 300 new SNPs that have been mapped and used to analyze LD in a core collection. This is a smaller core collection than what SolCAP will use. We estimate that LD decays over 3 to 14 centimorgans. In theory one could do an association mapping study with a lot less markers than in other crops. The pilot study also showed significant gametic-phase disequilibrium in processing and fresh market lines. This is a reflection of co-selection for genes on different chromosomes and is a consequence of breeding history. Association mapping in unstructured populations is unlikely to be successful. Mapping using nested association mapping (NAM) populations will therefore be dependent on how many markers we can identify in bi-parental cross. We have data that suggests that we will be able to develop crosses where several hundred markers are segregating. These numbers will permit QTL studies with a ~10 cM window, though they may not permit fine mapping. Initial analysis of GAI data suggests that we will be able to increase available marker resources by ten fold.

Discussion D (Research related)

A question was raised as to whether the budget would allow targeted sequencing of other varieties, beyond the 6 that SolCAP had budgeted, to increase the SNP frequency.

Conclusions

There are other programs currently underway that could possibly provide SNPs (e.g. GAI sequencing of M82 funded by NSF, J. Malouf, U.C. Davis). Our project does not have the time or budget for additional sequencing. David Francis' commented that we have the potential through a SNP consortium to add additional relevant SNPs (we budgeted for 1536, but may be able to achieve 7,600).

Discussion E (Research related)

Advisory board felt that it is important that SolCAP seek to integrate well with other initiatives around the world. For example, EUSOL is doing some parallel research (mapping and trait analysis for potato and tomato). We were urged to seek ways to integrate with other projects. The data collected by SolCAP should be compatible with data from other initiatives.

Conclusions

We are well integrated with other projects, including EUSOL efforts. We are working directly with SGN, specifically through the Breeder's portal effort and developing ontologies. As the ontologies are developed, they are on-line immediately. Our Co-Director, Lukas Mueller, is the director of SGN and they work with EUSOL for including data in their database. It was mentioned that the data sharing needs to work both ways, for example, EUSOL has accessed over 3000 accessions from the NPGS and that information is not publicly available yet. A positive interactive example includes an Illumina consortium that is being developed where SolCAP and some of the EUSOL participants have verbally indicated that they would be interested. The potato GAI data has been made available to the potato genome sequencing consortium. SolCAP feels we are doing our part.

Discussion F (Research Related)

How well do you know your Stakeholders? In discussions with Michael Coe, the response rate to questionnaires was nearly 80% in potato but less than 50% for tomato. However, this may only reflect the difference in public (potato) versus private (tomato) activities. Further surveys and questionnaires or interviews are needed to find out if some of the respondents may have been responding as a spokesperson for their organization.

Conclusions

One particular issue with private companies is that there has been quite a bit of personnel shifting due to companies buying out others. This makes it difficult to maintain current e-mail addresses. We attempt to keep current but part of the response rate could be because we just didn't reach them. In particular, Sun Seed people are all on Nunhems addresses and Seminis researchers are now on Monsanto addresses since inception of the project. In industry, they might not get involved until they actually see if there is anything useful for them. It was stated that a large company indicated that they didn't feel SolCAP was going to produce anything of interest to them, however, several people from their company participated in the workshop and found it useful.

The bottom line is that we are trying to collect information from surveys to make our project better. The fact is that in industry there are going to be groups out there that feel they can acquire this data or have already collected the data and have very little to gain from our efforts. On the other hand there are people that need a lot of help. Our surveys conducted at our tomato and potato workshops clearly show that the people attending significantly increased their knowledge in translational genomics and the positive outcomes to these workshops were clear. The newsletters got the information out, but it really took the workshops to get people engaged. For example the candidate gene interest increased dramatically after the workshop. The workshops not only reach the Breeding Program leaders but also their staff.

Discussion G(Education)

The USDA has used it's CAP program to revitalize the plant breeding curricula in particular graduate school education. Is it likely that SolCAP will develop specific conventional graduate student courses in plant breeding genomics and molecular marker development across various universities? They are aware of the on-line course development but want to know if there are plans for courses in a university course catalogue.

Second, what about staff, will they be able to take courses (perhaps not for credit, just to improve skills)?

Conclusions

Objective 1 describes our education goals. (see below) The plan is to have a team-taught distance education course across four universities. During pre-year 1, David Francis held a summer bioinformatics course which trained graduate students on translational genomics and molecular markers. This course was made possible by SolCAP. This year (SolCAP year 1), graduate student curricula will be taught as a live pilot course at Cornell University. Course material will be added to the SolCAP website.

Obj. 1. Create an education program to train graduate students in genome-based breeding. (De Jong, Francis, Douches, Van Deynze, Liedl)

Graduate students. Our first goal is to train graduate students who can actively conduct genomics-assisted breeding. We are currently developing a team-taught distance education course. The course will consist of modular, synchronized video, voice and powerpoint/chalkboard presentations, and carefully designed problem sets to teach and assess progress. The course will be made available without charge through the Cornell Transnational Learning Website (URL 3). CTL has extensive experience in developing and distributing plant breeding-related courses for a wide audience through streaming video. The course will be taught once a year and students will interact live with instructors on a weekly basis using text and voice features of Adobe Acrobat Connect. Graduate students at instructor institutions will be permitted to take the course for credit; others students seeking completion certificates will be offered extension or continuing education credits. Learning objectives for the course will be developed through extensive consultation between Douches, Buell, Van Deynze, Francis, and De Jong, with the latter taking the overall lead. Desired learning outcomes for students will include ability to: 1) describe current marker technologies; 2) describe appropriate marker use for indirect selection in breeding; 3) develop markers linked to any trait of interest; 4) explain limitations of markers; 5) navigate genome databases, including Solanaceae, to address breeding problems; 6) utilize analysis pipelines related to the collection and analysis of both phenotypic data and marker-trait 7 associations using SolCAP resources; 7) master key breeding/genetics concepts, such as the relationship between estimates of heritability and estimates of the strength of a QTL, and comparing trait-based to marker-based selection. Course assessment and objectives will be modified with input from the Cornell Center for Teaching Excellence, feedback from students, and technological and conceptual changes in the discipline. Suitable

members of Cornell plant breeding graduates will be recruited to help develop the curriculum and in the process, internalize many principles of translational genomics themselves.

Specific outcomes and Timetable: We will educate graduate students in the theory and practice of translational genomics for vegetable crops. This objective will be achieved by developing and delivering curricula through a team-taught distance education course across four universities. Year 1: Graduate student curricula will be taught as a live pilot course at Cornell University. Course material will be added to the SolCAP website. Years 2 and 3: A course will be added to the plant breeding curriculum at the participating institutions as a live course. Course material will be updated in subsequent years, integrating data and resources developed by SolCAP. In the third year, the course will be team-taught as a distance learning course.

In response to courses for staff, we are preparing information on eXtension with modules and the possibility opens up for continuing education credits. The courses will be taught in four institutions before it goes wider than that and staff members do enroll in those classes. It is a starting point, eventually we can reach a bigger community.

Discussion H (eXtension)

How separated should Tomato and Potato Community be in eXtension? Should the content be tailored to reflect the expertise of the two target groups, tomato and potato? In terms of the stakeholders, is there much of a difference between the two? The crops are obviously different and the public breeding vs. private breeding is also an issue.

Conclusions

On eXtension there will be a depth of coverage of information. The modules that we are developing for markers have a range of material which will include how to develop CAP markers and how to access much higher throughput genotyping platforms. The Organization content will make it accessible for both beginners and advanced professionals so that they will not waste time in areas they are not interested in or can't understand. We are going to have a range of older material and new cutting edge information. We are trying to build a skeleton which displays a start to finish example of translational genomics but if one wanted to learn more about specific techniques then there will be a place to go to get more in depth coverage. Collated information that is at different levels.

Discussion I (eXtension)

The advisory board feels that the work that has been completed during SolCAP's "pre-year" with PBGWorks, the CoP and eXtension is substantial and commendable.

In regards to the development of the eXtension resource material, the advisory board suggested that the content be made available to the Solanaceae community before it is placed in eXtension. Feedback from the community before it goes live would be of benefit, perhaps on the SolCAP website.

Conclusions

An issue with releasing the material outside of the eXtension umbrella (e.g. on the SolCAP website) is that search engines will pick it up. Once it is out there then archiving etc. will be difficult and dead links will be left once it is moved to eXtension. Extension.org prefers material that is unique. At the launch there needs to be a certain amount of content (up to 250 pages) that will entice people to return to the site. There is a possibility to have a soft launch and a hard launch (larger media launch). Broad educational outreach will require a wide spectrum of content. PBGWorks has protection from the search engines. So content can be developed and viewed by the members. This doesn't reach the extended community but could be utilized for previewing content. Everyone agrees that a well organized and well run national web initiative will be helpful and useful to the Solanaceae community, the plant breeding community and the public community.

Discussion J (eXtension)

The advisory committee expressed concern about using eXtension to reach the intended audience of professionals. The perception of the committee was that eXtension's time-lines a desire to launch a large amount of content at one time, and other procedural steps may inhibit the effectiveness of what SolCAP is trying to accomplish.

Conclusions

SolCAP's experience with the eXtension CoP application process has led us to have second thoughts about our choice of Extension delivery. We are committed to continue working with eXtension to meet the needs of our Community of Interest.

Discussion K

Will industry professionals be able to post job openings on the SolCAP website?

Conclusion

It would be possible, but it may be better to incorporate that into PBGWorks or eXtension. SolCAP would be open to listing job announcements in the SolCAP newsletter.