

EXPERT WORKING GROUP MEETING MINUTES

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Meeting of the Expert Working Group on Durum Wheat Genomics and Breeding

24 March 2014

Yaqui Room, Hotel Valle Grande

h. 18:30 to 20:00 pm,

Ciudad Obregon (Mexico)

Chaired by Roberto Tuberosa and Luigi Cattivelli (Italy)

Participants

Luigi Cattivelli (CRA, Italy)	Curtis Pozniak (Univ. Saskatoon, Canada)
Roberto Tuberosa (University of Bologna, Italy)	Ron DePauw (Agriculture and Agri-Food Canada)
Filippo Bassi (ICARDA, Morocco)	Thapa Drhuba (CIMMYT, Nepal)
Karim Ammar (CIMMYT, Mexico)	Fanny Alvaro (IRTA, Spain)
Steven Xu (USDA-ARS, USA)	Ignacio Solis Martel (MasAgro, Spain)

Agenda

1. Summary of the EWG-DWGB aims and activities
2. Update on the durum SNP consensus map
3. Special issue on durum genomics (Molecular Breeding)
4. Workshop on durum wheat genomics and Congress "From Wheat to Pasta and Beyond"
5. Roadmap for sequencing the durum wheat genome
6. Presentation and discussion of the results of the questionnaire
7. Next actions

Attachments

Summary of the results from the durum wheat survey

MINUTES

1. Summary of the EWG-DWGB aims and activities

Tuberosa summarised the main expected outputs of the EWG-DWGB: (i) the definition of worldwide research priorities for durum wheat genomics and breeding; (ii) the facilitation of interactions and collaborative activities within the durum community and (iii) encourage closer collaboration with the members of the other EWGs of the Wheat Initiative and, on a broader scale, the bread wheat community. Additional details on the EWGs are available on the Wheat Initiative website (<http://www.wheatinitiative.org/about/expert-working-groups>).

2. SNP consensus map

The first collaborative activity developed in the frame of the EWG-DWGB is the preparation of an SNP-based consensus map for durum wheat. Tuberosa reported the latest results on the consensus map that is based on eight durum x durum, three durum x *diccocum* and two durum x *dicoccoides* maps contributed by different research groups. The map has been completed by Maccaferri et al. (University of Bologna) and includes approximately 30,000 SNP markers. Tuberosa pointed out that prior to its publication the SNP map will be made available under MTA to all those who will request it. All requests should be addressed to roberto.tuberosa@unibo.it, and also to Chiara Colalongo at colamc@libero.it in Ccopy. Once accepted for publication, the SNP map database will be uploaded on the Wheat Initiative website and will be made publicly available.

3. Special Issue on durum genomics for Molecular Breeding

This special issue will target manuscripts reporting novel results on durum wheat genomics (and other -omics) platforms and approaches in order to enhance wheat productivity and quality. This notwithstanding, any other manuscript dealing with durum genomics (-omics) will be equally suitable. The tentative title of the special issue is:

Genomics platforms and approaches for durum wheat breeding.

All manuscripts will undergo the peer-review process adopted by Molecular Breeding.

The tentative time schedule and deadlines for managing the special issue are the following.

May 30 – Those of you interested in submitting a manuscript are kindly requested to send at their earliest convenience - and not later than May 30 - the tentative title(s) and authors' list of your contribution(s). In case you may also have an abstract available, please enclose the abstract as well. Additionally, **please specify whether you would prefer publication of the Special Issue in the last issue of 2014 or in the first issue of 2015 of Molecular Breeding.** Please, send your message to my email address (roberto.tuberosa@unibo.it) and also to Chiara Colalongo at colamc@libero.it in Ccopy.

July 15 – Final deadline for submission of manuscripts to Molecular Breeding following the usual procedure specified on the Journal website.

August 15 – Based on the reviewers' response/comments, the Associate Editor will send the final decision (accept/revise/reject) to the corresponding author.

September 15 – Final deadline for returning the revised manuscripts to the Associate Editor.

September 30 – Final decision taken by the Associate Editor

December 15 – Publication as last 2014 issue of molecular Breeding.

The manuscript on the SNP consensus map will be submitted for publication in this special issue of Molecular Breeding. The submission to this special issue of other manuscripts based upon the use of the SNP-based consensus map (see point 2) is encouraged.

4. Workshop of the EWG-DWGB and Congress "From Seed to Pasta and Beyond"

The workshop will be organised in concomitance to the Congress "From Seed to Pasta and Beyond" to be held in Milano (Italy) from May 31 to June 3 during EXPO 2015. The main themes of EXPO 2015 will be Food Security and Nutrition (see <http://en.expo2015.org/>). Additional details about the Congress "From Seed to Pasta and Beyond" will be circulated soon.

5. Roadmap for sequencing the durum wheat genome

Cattivelli introduced the topic and summarised the ongoing discussion on the best strategy to be adopted. The project is based on the collaboration among several research groups and it is open to additional contributions. The Italian National Research Council (CNR) will support the initiative with Euro 300K. Additionally, the Agricultural Research Council of Italy, ENEA, the University of Bologna and the University of Udine will provide in-kind contributions for a total of approximately Euro 250K. Other in-kind contributions have been announced by the University of Saskatoon, Sabanci University and TGAC while two additional ones are being discussed.

During the discussion it was suggested that the consortium involved in the sequencing of durum wheat genome should prepare a short document describing the positive impact of genome sequencing

on durum breeding activity. The document will be sent to the durum wheat community in order to make its members aware of the new opportunities that genome sequencing will open for breeders and, more generally, for durum wheat users.

6. Presentation and discussion of the results of the questionnaire

As to the first point, a questionnaire was sent in December to the members of the EWG-DWGB. The results of the questionnaire are summarized in the attached file. These results were discussed and the following conclusions were reached.

The questionnaires highlighted a general interest of the durum wheat community for genomics, markers and breeding activities. In particular, the characterization of cultivars, landraces, *T. dicoccum* and *T. dicoccoides* was the topics with received most preferences (27 votes out of 30 questionnaires) suggesting a particular interest of the durum wheat community to germplasm resources.

Several topics among those proposed in the questionnaire received very low priority (e.g. Characterization of wild relatives from the secondary and tertiary gene pool; Germplasm resources for evolutionary studies; Genetic engineering and Nutrient-use efficiency) suggesting that the durum wheat community does not perceive these research topics as priority targets.

Actions: (Who to do what by when)

7. Next actions

- Nomination of the Executive Committee (c/o Cattivelli and Tuberosa), currently in progress.
- Following the nomination of the Executive Committee, a Chair and Vice-Chair will be elected within its members.
- Based upon the results of the questionnaire and close consultation with other EWGs, the Executive Committee will draft a Strategic Research Agenda in close collaboration with the other EWG of the Wheat Initiative. The draft will be circulated for comments/suggestions to all the members of the EWG-DWGB.
- The next EWG-DWGB meeting will be held at the end of June (date and venue to be decided) at the ITMI workshop in Wernigerode, Germany (c/o IPK).

Additional documents

Summary of the results of the questionnaire on research priorities for durum wheat genomics and breeding

(30 questionnaires were received)

The EWG aims to synergize the research activities in durum wheat genomics and breeding.

The first step of this process is the identification of **world-relevant research priorities** to be addressed in order to enhance the genetic progress in durum wheat production and quality.

Below, we have listed a number of topics covering most of the ongoing research activities in durum wheat genomics and breeding.

The survey was carried out asking the EWG members to **highlight:**

- 1. the six research topics with the highest priority from 1.1 to 3.6**
- 2. the three research topics with the highest priority from 4.1 to 4.5**

Sequencing of durum wheat genome TOT 47 votes

Sequencing and assembly of a reference durum wheat genome	22 votes
Genome and/or transcriptome resequencing of founder and/or other accessions	13 votes
Development of resources to investigate gene function	12 votes

Germplasm resources TOT 47 votes

Characterization of cultivars, landraces, <i>T. dicoccum</i> and <i>T. dicoccoides</i>)	27 votes
Characterization of wild relatives from the secondary and tertiary gene pool	4 votes
Development of populations and IL lines suitable to map and clone genes	16 votes
Germplasm resources for evolutionary studies	4 votes

Molecular-based breeding activities TOT 85 votes

SNP-based consensus map	15 votes
Mapping and cloning of valuable loci	17 votes
Development and validation of user-friendly markers	17 votes
Marker-assisted breeding	16 votes
Genomic selection and other new breeding technologies	14 votes
Genetic engineering	6 votes

Trait-specific topics TOT 82 votes

Resistance to abiotic stress	23 votes
Resistance to biotic stress	18 votes
Nutrient-use efficiency	8 votes
Yield potential, hybrid vigour and yield stability	13 votes
Quality-related traits and issues	20 votes