

To: The Dean of Graduate Studies

From: PhD student

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Department \_Evolutionary Biology

Stage: (please circle) 1st Stage/ 2nd Stage

## Annual Progress Report

**Submission to the Graduate studies Authority by the departmental secretary only**

### Part A – designated for PhD Student

**Describe the goals as presented on your letter of intentions/ research proposal, and your current research achievements.**

The main objective of this project is to dissect the genetic and genomic differences between cultivated wheat and its wild progenitor, *Triticum dicoccoides*, with respect to trait complexes related to domestication, evolution under domestication, and productivity.

Until now, we summarized our results in two scientific papers (Tzarfti et al., 2013; Tzarfati et al., 2014) and the third paper has submitted recently.

The first part of the research was based on field trials, and phenotypic measurements of domestication traits based on quantitative approach rather than qualitative classification that were characteristic of previous studies. We described in detail the advantages and considerations that were related to the transition to plants with non-brittle rachis and easy threshing. (Tzarfari *et al*, 2013). This paper was highlighted in the well known scientific journal *Nature*.

The second part of the study is genetic mapping of the quantitative traits loci (QTLs) controlling the differences between the domesticated wheat and its wild progenitor. For QTL analysis, we applied quantitative scores of the domestication related traits, that was more informative in the deciphering the genetic architecture of the main components of the domestication syndrome. We found novel QTLs that relate to major domestication traits and traits that evolved under domestication (Tzarfari *et al.*, 2014).

The third part of the study is to assess the differences in genome expression between domesticate wheat and its wild progenitor, with a special focus on the glumes. To do that, we employ a novel approach for genome expression analysis, RNA-seq analysis based on direct sequencing of the transcripts via next generation sequencing technology. Extracted

RNA was processed and RNA-sequencing conducted using Illumina platform sequencing. The new results should highlight the domestication evolution processes, and could be very beneficial for future breeding efforts.

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Estimated date for submitting PhD dissertation to the PhD departmental committee

\_\_\_\_\_ October 2015

Ph.D. student Name:    Raanan    Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Part B - designated to the research the Chairperson of PhD Committee)**

**Please refer to the student progress and to the estimated date for submission of dissertation**

There was a very good progress in this PhD study. All experimental work and the analysis were successfully completed. In addition to the first paper on phenotypic analysis of domestication traits, that was already published in 2013, a new paper summarizing the results on genetic mapping of these traits was prepared and published 2 month ago in *Molecular Breeding*. In this work, a detailed QTL mapping analysis was conducted with new results on the genetic factors affecting the key domestication traits. The obtained evidence strongly supports our concept of genome asymmetry. More recently, we submitted another paper, devoted to comparative analysis of domesticated wheat and its wild progenitor based transcriptome assay (RNA-seq). We have identified a few genes that may be related to glumes toughness and nutrient remobilization that could probably be involved in wheat evolution under domestication. In general, this work provides a foundation for further study on candidate genes involved in wheat domestication evolution process.

I expect that the thesis will be submitted in time, i.e., till August 2015.

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**PhD research evaluation**

(The evaluations relate to all researches previously supervised by you)

Evaluation	Poor	Average	Good	Very good	Ranked in the top 5%
Novelty				v	
Clarity of research and hypothesis			v		
Criticism				v	
Knowledge of Background material				v	
Knowledge of research methods			v		
Comments					

Supervisors Name: Avraham Korol

Signature: \_\_\_\_\_



Date: 26.03.2014

Chairperson of PhD Committee Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_