

# B4EST

## Adaptive BREEDING for productive, sustainable and resilient FORESTs under climate change

### *Deliverable D6.4*

### Report on training courses

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## TABLE OF CONTENTS

1	Summary.....	3
2	Introduction .....	3
3	Results .....	3
3.1	Training session 1 .....	3
3.2	Training session 2.....	4
3.3	Training session 3.....	4
4	Conclusions.....	5
5	Partners involved in the work .....	5



## 1 Summary

Key scientific results, new tools and new methodological developments produced in the framework of B4EST were initially foreseen to be disseminated via three hands-on training events (from M30-M45) to Master and PhD students and post-doctorate fellows. These events will be organized by the academic partners (UPS; SLU; CIRAD; NIBIO; UU; INRA; UOULU; CNR) and open stakeholders interested by the topics.

They will be linked to university curricula and highly relevant, existing other training initiatives (e.g., EVOLTREE labeled or HOMED training courses). The first training course will cover: i) phenotypic plasticity evaluation and norms of reaction modelling (linked to WP1, 3 days), ii) Contribution of GWAS to the understanding of the evolution of quantitative traits under natural selection (linked to WP2, 3 days), iii) The impact of integration of biological information (gene networks) on the accuracy of genomic prediction (linked to WP3, 3 days).

Due to the COVID-19 limitations occurring since March 2020, it was decided that the courses will be organized remotely in the form of videos/online tutorials. This will allow the production of more durable training and will target a larger audience, including stakeholders interested in the topics.

## 2 Introduction

The programme of these three courses has been discussed among the eight partners involved during the 2<sup>nd</sup> Annual Meeting of the B4EST project in April 2020, and in two other web-meetings (June 23<sup>th</sup> & October 6<sup>th</sup> 2020), held in visio-conference because of the COVID-19 crisis.

## 3 Results

### 3.1 Training session 1

A specific session at B4EST 2<sup>nd</sup> annual meeting in April 2020 has been dedicated to the preparation of this training session that will disseminate results and analytic tools from WP1, especially from Task 1.3.

The title of this training course is “**Phenotypic plasticity evaluation and norms of reaction modelling adapted to forest trees**“. This 3-day course organized by SLU under the responsibility of Prof. Harry Wu was initially foreseen to be held in October 2020 in Umeå. It is now postponed to October 2021 as a web-training session. The topics related to WP1 will be the following:

- (1) Introduction to genecology.
- (2) Response functions – norm of reactions (in link with Task1.3 and Deliverable D1.2).
- (3) Integration of genetic and environmental effects into a linear mixed model or a universal response function (URF) (in link with Task1.4).
- (4) Model comparisons and selection.
- (5) Case studies of Norway spruce provenance, family and clonal plasticity and norm of reaction.



- (6) Reaction norm estimated on microdendrometer data on an annual and daily basis for Maritime pine, Douglas-fir, and Eucalyptus (in link with case-studies developed in Task 1.3).  
(7) New modelling method on plasticity and norm of reaction including genomic base of norm of reactions.

The course organizers and instructors include: Harry Wu (SLU), Tongli Wang (UBC, B4EST External Advisory Board), Arne Steffenrem (NIBIO), Laurent Bouffier (INRA), Philippe Rozenberg (INRA), Marie Denis (CIRAD), Jean-Marc Gion (CIRAD), Maurizio Marchi (CNR).

The targeted audience will be graduate students and postdocs from B4EST project and outside (e.g. SLU and Umeå University, publicity from EVOLTREE, publicity from B4EST). It will be also open to researchers and tree breeders interested in the topic.

### 3.2 Training session 2

This training session will disseminate results and analytic tools from WP2 especially from Task 2.2. The title of this training course is “**Genetic basis of quantitative traits and multitrait association**”.

It will be organized by UU in Uppsala for 20-30 students and will be under the responsibility of Prof. Martin Lascoux. This 3-day course will be held in Spring 2021 either in Uppsala or organized as a web-course.

It will reflect the understanding of quantitative traits and the main current models, understanding concepts rather than particular packages, i.e. more a state-of-the-art at theoretical levels in genetics of quantitative traits. The first day the “infinitesimal to the omnigenic model” will be presented, the second day will be dedicated to the “omnigenic model and the evolution of quantitative traits architecture” and in the third day, the consequences of the omnigenic model for genome wide association will be evaluated from what we already know and what needs to be known.

The different partners involved in preparation of the 3 days training session are: Martin Lascoux (UU), Pascal Milesi (UU), Santiago Gonzalez-Martinez (INRA), Tanja Pyhäjärvi (UOULU), Sonja Kujala (UOULU), Beppe Vendramin (CNR). A couple of external speakers will be invited.

The targeted audience will be graduate students and postdocs from B4EST project and outside (e.g. Uppsala EBC graduate school, publicity from EVOLTREE, publicity from B4EST). It will be also open to researchers, tree breeders.

### 3.3 Training session 3

This training session will disseminate results and analytic tools from WP3 especially from the innovative Task 3.3. The provisional title of this training course is “**The impact of integration of functional genomic information on the accuracy of genomic prediction**”

It will be organized during 3-4 days in Summer 2021 in Toulouse by UPS and will be under the responsibility of Jacqueline Grima-Pettenati and Fabien Mounet. A web-access will be organized.



The different partners involved in preparation of the 3-4 days training session are: 1/ UPS- Jacqueline Grima-Pettenati/Fabien Mounet; 2/ UOULU- Tanja Pyhajarvi; 3/ UU- Martin Lascoux; 4/ INRA – Leopoldo Sanchez-Rodriguez.

The targeted audience will be graduate students and postdocs from B4EST project and outside (publicity from EVOLTREE, publicity from B4EST). It will be also open to researchers. A web-meeting early 2021 will be dedicated to the preparation of this training session.

## **4 Conclusions**

The programs of the two first training courses have been defined in order to disseminate key results and new tools for the first two WPs. Because of the situation due to COVID19 and to enlarge access to an enlarged interested public, web-based courses will be organized.

## **5 Partners involved in the work**

Eight academic partners of B4EST are involved in the preparation of these courses:

UPS, SLU; CIRAD; NIBIO; UU; INRA; UOULU; CNR.