EXPLOITABLE FOREGROUND

A model enabling to explore the impact of morphological, phenological and physiological trait combination on sugar and grain productions

Explanation and Purpose

A plant growth model initially dedicated to simulate rice and sorghum vegetative morphogenesis, Ecomeristem, was adapted during the SWEETFUEL project in order to account for traits contributing to sugar production, i.e. related to plant phenology vs organ morphogenetic characteristics: internode (sink) and leaf (source) elongation rate, size and number, internode sweetness capacity and panicle initiation.

Accordingly the model is available to explore optimal trait combination and maximize sugar production in targeted environments.

Exploitation Strategy

This modelling approach will be used in at least two companion projects of SWEETFUEL in support to (pre)breeding process: French project "Biomass for the Future" (BFF, 2012-2020) and French-Italian project "Biosorg" (2014-2016).

In these projects Ecomeristem will be used to analyse phenotypes within existing genetic diversity (trait quantification: phenotyping) and explore ideotypes for maximizing targeted production(s) in targeted environments.

Further Research

The consideration of drought effect as well as the post-flowering competition with grain filling is underway and will provide at the end of the project a relevant tool to analyse and explore dual purpose (grain/sugar) phenotypes and genotype X environment interactions.

Further researches are needed to improve Ecomeristem for appropriately formalizing the genotypic (genetic) and environmental bases of carbon allocation to internode components (sucrose, lignocellulose). This will be performed in BFF and Biosorg projects.

Impact of Exploitation

Accepted projects: French project *Biomass For the Future* (http://www.biomassforthefuture.org) and BioSorg (Franco-Italian project).

SWEETFUEL

Sweet Sorghum: an alternative energy crop

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