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Biotic and Abiotic Stress Tolerance in Plants: the Challenge for the 21st Century

BOOK OF ABSTRACTS

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Workshop on Biotic and Abiotic Stress Tolerance in Plants: the Challenge for the 21st Century

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S03P07

Analysis of *DREB1D* gene sequence in different *Coffea* genotypes

G.S.C. Alves, L.P. Freire, N.G. Vieira, D. This, D. Pot, P. Marraccini, L.V. Paiva, A.C. Andrade
Embrapa Genetic Resources and Biotechnology/LGM, 70770-917, Brasília-DF, Brazil
Email : alan.andrade@embrapa.br

In several plant species, the *DREB* genes play a key role in responses to abiotic stress. Since the development of molecular markers is one of the major goals for accelerating breeding programs, a study was done to evaluate the sequence variability of the *DREB1D* gene in several *Coffea* genotypes. The promoter and coding regions of this gene were cloned and sequenced from 16 coffee plants (including 10 from *C. arabica* and 4 from *C. canephora*), most of them characterized by different phenotypes (tolerance vs. susceptibility) regarding to drought. This showed that the *DREB1D*-coding sequence was highly conserved within coffee plants. However, several nucleic polymorphisms ("single nucleotide polymorphism" [SNP] and insertion/deletion [INDELs]) were found in the coffee *DREB1D* promoter regions. These polymorphisms could explained the differences of *DREB1D* gene expression levels previously observed in leaves of drought tolerant and susceptible clones of *C. canephora*. These polymorphisms also allowed the identification of different haplotypes like orthologous sequence variants (OSVs) of *C. canephora* and *C. eugenioides* as well as homologous single-nucleotide variants (HSVs) for *C. arabica* subgenomes (*C. canephora* and *C. eugenioides*) that could be used to develop allele and homoeologous specific markers for this locus. Work is now under way to evaluate the capacity of *DREB1D* promoter regions to control the expression of the *uidA* reporter gene in transgenic coffee plants.

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S03P08

Functional analysis of *CcDREB1D* promoter region from two genotypes of *Coffea canephora* through genetic transformation of *Nicotiana tabacum*

S.O. Aquino, K.E. Duarte, G.S.C. Alves, P. Marraccini, A.C. Andrade
Embrapa Genetic Resources and Biotechnology/LGM, 70770-917, Brasília-DF, Brazil
Email : alan.andrade@embrapa.br

Although some studies in plant physiology resulted in a better understanding of the mechanisms involved in drought tolerance in coffee, knowledge about the metabolic and molecular changes involved in the response of the coffee plant to water deficit conditions is still scarce. Recent studies permitted the identification of several candidate genes presenting differential expression between genotypes contrasting (tolerant vs. susceptible) to this trait. In many higher plants, *DREB* genes were shown to be involved in the transduction pathways of water stress. Previous results showed that *CcDREB1D* gene expression increased under drought stress in leaves of drought-tolerant clone 14 but not in those of the drought-susceptible clone 22 of *Coffea canephora*. By sequencing the *DREB1D* promoter regions of these clones, several nucleic polymorphisms ("single nucleotide polymorphism" [SNP] and insertion/deletion [INDELs]) were found. In order to know if these polymorphisms could explain the differences of *DREB1D* gene expression observed between the clones 14 and 22 of *C. canephora*, 5 'deletions of several alleles of the *CcDREB1D* promoter regions were made and cloned in the binary vector pBI101 in order to analyze their ability to control the expression of the *uidA* reporter gene in transgenic tobacco (*Nicotiana tabacum*) plants.

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S04P01

Genetic mapping and QTLs detection in a *Theobroma grandiflora* progeny

A.S Nascimento(5), RM. Alves(1)*, PSB. De Albuquerque (2)*, RS. Silva (1), HO. De Oliveira(1), CR. Dos Santos(2), T. Kempner(2), LF. Dos Santos(3), L. Marcellino (3), F. Micheli(4), K.Gramacho(5) and D. Clément(5)*

(1) Dr. Enéas Pinheiro S/N, Bairro do Marco, CEP: 66.095-100 (CPATU, Belém Para Brazil)

(2) KM 17. BR 316, CEP 67105-970.Marituba-(CEPLAC-ERJOH. POBox 46.,Marituba Para Brazil)

(3) Parque Estação Biológica - PqEB - Av. W5 Norte (final) CEP: 70770-917(CENARGEN POBox 02372 – Brasília – Brasil)

(4) Rodovia Jorge Amado, km 16 - Cep: 45.662-000 UESC Ilhéus Bahia Brazil)