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Patrocínio Prata



Patrocínio Ouro



Apoio



Plant Cell Wall Degrading Enzymes Genes from The Boll Weevil, *Anthonomus grandis* (Coleoptera: Curculionidae)

José D. Antonino-de-Souza, Jr.; Clídia E. Moreira-Pinto; Roberta R. Coelho; Alexandre A. P. Firmino; Robert N. G. Miller; Maria F. Grossi-de-Sá

During evolution, plant and pests co-evolve together developing mechanisms to survive to each other. Some insects have acquired, by horizontal gene transfer (HGT), enzymes able to degrade plant biomass and many of them are pests of important crops. The cotton crop is one of the largest segments of the Brazilian agribusiness and it is severely attacked by the coleopteran *Anthonomus grandis*. This pest causes great damage to cotton flower bud and boll reducing the quality of cotton fiber. In this work we have focused especially in identifying plant cell wall degrading-enzymes (PCWDE), especially cellulases and hemicellulases, and how these genes are expressed along different *A. grandis* tissues. We have searched for PCWDE sequences in *A. grandis* midgut transcriptome previously sequenced using next-generation sequencing technology. We have found these genes using tBlastN tool with PCWDE protein sequences from other insects as queries. We have identified contigs belonging mainly to glycosyl hydrolase (GH), carbohydrate esterase (CE) and pectate lyase (PL) enzyme families. Specifically, we have found 11 contigs homologous to GH28, five to GH45, four to GH48, two contigs homologous to CE, and three to PL4. We have analyzed the phylogenetic relationship of these genes to show their close relation with microbe genes. Furthermore, we have validated these genes expression by RT-qPCR. Most of genes were expressed majorly in anterior midgut portion. Finally, we have studied in more detail how carbohydrate esterases are expressed at *A. grandis* different life stages and validated if these genes were essential for *A. grandis* development using RNA interference (RNAi). We have proved that, like other curculionids, *A. grandis* has a whole PCWDE arsenal probably used to degrade cellulose and pectin present in cotton bolls and flower buds. These findings could be used to develop new tools to aid in efficient control of this pest, and possibly help production of ethanol from plant biomass.

Palavras-chave: Herbivory; Cellulase; Pectinase

Apoio institucional: FAPDF, UnB, CAPES, CNPq and EMBRAPA

Filiação institucional: 1 Departamento de Biologia Celular, Universidade de Brasília, Campus Darcy Ribeiro, Asa Norte, 70910-900, Brasília-DF, Brazil; E-mail: bioantonino@gmail.com 2 Embrapa Recursos Genéticos e Biotecnologia, PqEB, Av. W5 Norte (final), 70770-901, Brasília-DF, Brazil.