

OrMo15:40

Two resistance inducers relevant in coffee plant protection show distinct metabolic adjustments

K. Possa^{1,2}, J. A. G. Silva¹, R. Tenente², C. Pinheiro^{3,4}, I. Chaves^{3,5}, S. Planchon⁶, A. C. A. Monteiro¹, A. C. Souza⁷, J. Renaut⁶, M. A. F. Carvalho⁸, C. P. Ricardo³, M. L. V. Resende¹, L. Guerra-Guimarães^{2,9}

¹Dep. Fitopatologia, Universidade Federal de Lavras - UFLA, Brazil

²Centro de Investigação das Ferrugens do Cafeeiro, Instituto Superior de Agronomia, Universidade de Lisboa, Portugal

³Instituto de Tecnologia Química e Biológica/Universidade NOVA de Lisboa, Portugal

⁴Faculdade de Ciências e Tecnologia/Universidade NOVA de Lisboa, Portugal

⁵Instituto de Biologia Experimental e Tecnológica, Portugal

⁶Luxembourg Institute of Science and Technology, ERIN department, Luxembourg

⁷Dep. Fitotecnia, Universidade Federal de Lavras - UFLA, Brazil

⁸Embrapa Café, Brasília, Distrito Federal, Brazil

⁹Linking Landscape, Environment, Agriculture and Food, Instituto Superior de Agronomia, Universidade de Lisboa, Portugal

leonorguimaraes@isa.ulisboa.pt

A good strategy in plant protection is to take advantage of the plant immune system by eliciting the plant's constitutive defenses. Based on this concept resistance inducers have been developed and are commercially available, such as Bion®. An alternative formulation Greenforce CuCa was developed by UFLA partners in Brazil which showed promising results for the control of coffee rust (*Hemileia vastatrix*). We established as working hypothesis that resistance inducers impose metabolic adjustments at the cellular level, mainly on photosynthesis and its regulation. A physiological (leaf gas-exchange) and proteomic (2DE-MALDI/TOF/TOF MS) analysis was performed in *Coffea arabica* leaves sprayed with GreenForce CuCa, Bion® or water (control), followed by the inoculated with *H. vastatrix*. Our results showed that GreenForce CuCa and Bion® triggered opposite responses in leaf stomatal conductance and instantaneous photosynthetic rate. While application with GreenForce CuCa increased leaf-gas exchange, application with Bion® caused a decrease in photosynthesis and stomatal conductance. The proteomic data obtained revealed changes at photosynthetic and respiratory metabolism. Additionally, proteins involved in hormonal signaling were also observed. Taken together, our data support a role for the primary metabolism in defense responses, but the two resistance inducers seem to operate in different ways. This opens new perspectives for the research of plant induced resistance.

Acknowledgements

This work was supported by Portuguese Funds through FCT (Fundação para a Ciência e a Tecnologia), under the project PTDC/AGR-GPL/109990/2009 and the strategic project PEst-OE/EQB/LA0004/2011, and by Brazilian Funds through CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico), INCT-Café (Instituto Nacional de Ciência e Tecnologia do Café) and FAPEMIG (Fundação de Amparo à Pesquisa no Estado de Minas Gerais).