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Differential expression and sequence data mining of genes induced during *Coffea arabica* L-*Hemeleia vastatrix* L interactions

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Countering the economic hurdle caused by coffee leaf rust disease is most appealing than any time as it has posed a major threat once again on coffee production. Establishing differential expression profiles at different times following pathogen invasion in both innate and acquired immunities unlocks the molecular components of resistance and susceptibility. Suppression subtractive hybridization (SSH) was used to unveil genes differentially over expressed and repressed during incompatible and compatible interactions between coffee and rust fungus. A total of 433 resistance related expressed sequence tags (ESTs) were sequenced; from which 354 were annotated and categorized based on biological function and cell component. We used four databases in searching for significant matches using local alignment tools and evaluated the integration and sharing of sequences among data repositories. The result shows different types and numbers of genes were differentially expressed in both interactions in up-regulated and down regulated libraries. Despite the ever increasing size of databases and homology search tools, the extent of integrity and data sharing between databases was found to be inconsistent. The work enlightens the different types of resistance related genes to be used in resistance development and shows the challenges in homology search and database integration between different sources.

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Influence of heavy metals in plant infection and protection

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In the last three decades, the industrial and human activities in crop plants area of Alexandria have been increased dramatically and resulted in continuous invasion with different types of pollutants. Heavy metals are the most important pollutants in some agricultural areas in Alexandria governorate, Egypt. The aim of the present study is to determinate the concentrations levels of eight heavy metals (Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn) in white, corn and rice of certain agricultural sites in Alexandria sites which collected from Abu-Qir agricultural market, El-agamy agricultural market, the Eastern farms and Western farms. The obtained results clarified that the highest average was for Zn in sites Eastern farms, El-agamy and western farms, respectively. While, highest average of Pb was recorded in Western farms and El-agamy agricultural market sites, respectively. Moreover, Cd showed the highest values in the sites Abu-Qir Agricultural market and El-agamy agricultural market consecutively. On the other hand, the average values of trace metals (Cu, Fe, Mn and Ni) around the agricultural markets and farms areas Alexandria were in levels below the hazard concentrations. Also, the concentrations of the studied heavy metals in all sites were found to be within the safe limits. The target hazard quotients (THQs) values of most investigated metals in crop plants and final products were much smaller than one, which may indicate that there is no health risk.

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Page 95