W115

Biology and Genomics of *Phytophthora* spp.: Fight Against a Potential Global Chocolate Famine

Date: Sunday, January 11, 2015
Time: 2:35 PM
Room: Royal Palm Salon 3-4

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Theobroma cacao is currently under serious threat due to various diseases, of which *Phytophthora* pod rot, commonly called ‘black pod’ is one of the most economically important. Four fungal species of the same genus are primarily responsible for this disease: *P. palmivora, P. megakarya, P. capsici* and *P. citrophthora*. Among these, *P. palmivora* is the most common, being present in most cacao producing countries. *P. palmivora* can cause yield losses of 20-30% and tree mortality of 10% annually. *P. megakarya* occurs only in West African countries, but is the most virulent among the four species. In Africa it causes 30-90% annual crop losses and thus it poses a severe threat to the cacao industry and to producers in Africa. Both *in vitro* pod husk inoculation assays and *in planta* pod inoculation assays verified that *P. megakarya* was more aggressive. Studies suggest effective e*arly penetration by P. megakarya* makes it a more destructive pathogen. Since the *Phytophthora* species that cause disease on cacao differ so much in their virulence, we developed specific primers for QPCR identification of each species. At the same time we characterized the genetic diversity of *P. palmivora* and *P. megakarya* in Ghana, a major producer. Through further genetic analysis, we estimate the genome size of *P. megakarya* to be 116.9 Mb and the *P. palmivora* genome size to be 100 Mb*. P. palmivora appears to be tetraploid whereas P. megakarya*, despite its larger genome, is not. Comparative genome analysis between these two species shows that both species carry large numbers of plant-pathogen interaction proteins including the RxLR effectors. An in-depth comparative analysis of genomics and transcriptomics between these two closely related species is being carried out to highlight *the molecular mechanism behind their* virulence and support the development of effective control measures. This is critical since *Phytophthora* spp. in general and *P. megakarya* specifically, represent a significant threat to cacao production and the chocolate industry worldwide.

Back to: Cacao Genomics Workshop

<< Previous Abstract | Next Abstract >>

Meeting Information

When:
January 10 - 14, 2015
Where:
San Diego, CA