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During my two-week visit to ISPA, I worked on a project aimed at identifying a chemical compound that is the product of an enzyme that is produced by multiple species of the fungus *Fusarium* when they are grown on maize. The enzyme is designated Pks9, and the gene that encodes it is designated *PKS9*. Because the *Fusarium* species examined can occur on maize, Pks9 and the chemical compound produced by it may be important in the interaction of the fungi and maize. The *PKS9* gene was identified in a collaborative project between ISPA scientist Dr. Antonio Moretti and me, when he visited my lab at the USDA ARS NCAUR. Prior to my visit to ISPA, I generated a strain of the fungus *Fusarium verticillioides* in which the *PKS9* was inactivated by standard molecular biology mutation methods. Prior to my visit, I sent the mutated strain and the wild-type (normal) progenitor strain from which the mutant strain was derived to ISPA. At ISPA and the mutant and wild-type strains were grown on maize medium, and after one and two weeks, the resulting cultures were subjected to chemical extraction to determine the presence and absence of chemical compounds. We expected that the wild-type progenitor strain would produce a chemical compound that is the product of the Pks9 enzyme and that the mutated strain would not produce the compound. This analysis was complicated by the fact that *F. verticillioides* produces a large number of compounds. Nevertheless, in collaboration with Professor Alberto Ritieni at the University of Naples, several compounds were observed in extracts of the wild-type progenitor strain but not in the mutated strain. Further analyses are underway to determine the structure of these compounds. We also used the genomic sequence database of *F. verticillioides* to examine the entire sequence of the *PKS9* gene. This analysis allowed us to determine the enzymatic/functional domains that should be present in the Pks9 enzyme. From this analysis, we determined that the chemical compound that is a product of the Pks9 enzyme most likely consists of a fusion of two chemicals; one of the chemicals belongs to a group of metabolites known as polyketides and the other chemical is most likely an amino acid.

CNR scientists and I also designed and initiated experiments on three additional projects. These projects are: 1) Examination of the genetic diversity of isolates of the mycotoxin-producing fungus *Fusarium proliferatum* from Africa, Asia, Europe and North America; 2) Examination of the cluster of genes responsible for production of the mycotoxins fumonisins in multiple species of *Fusarium*; and 3) Examination of the presence and absence of fumonisin biosynthetic genes in isolates of the fungus *Aspergillus niger* isolated from grapes in Italy. Work on these collaborative projects has continued since my return to the USDA ARS NCAUR. The collaborative research begun during my visit to ISPA has already resulted in the following publication: Proctor R.H., Desjardins A.E. and Moretti, A. Biological and chemical complexity of *Fusarium proliferatum*. Pages xxx-xxx, in The Role of Plant Pathology in Food Safety and Food Security. R. Strange and M.L. Gullino editors. Springer. In Press

Regards,

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