

# New Web resource to improve crop engineering

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Stanford, CA. The Carnegie Institution's Department of Plant Biology announced the launch of a new web-based resource that promises to help researchers around the world meet increasing demands for food production, animal feed, biofuels, industrial materials, and new medicines. It is the Plant Metabolic Network (PMN) at <http://www.plantcyc.org/>

"To use plants to their full potential, it is crucial to understand the chemical reactions that happen in metabolic processes, such as converting carbon dioxide to biomolecules, transporting nutrients, responding to the environment, and otherwise maintaining life," commented principal investigator Sue Rhee.

"This collection of databases is the first of its kind to be dedicated exclusively to plant metabolism. Researchers will have, right at their fingertips, what they need to understand and engineer a variety of different plants," remarked Eva Huala, co-principal investigator.

The project is a collaboration among varied databases and biochemists to create a broad network of information about plant metabolic pathways. A central feature is PlantCyc, a comprehensive plant biochemical pathway database with information from the literature and about the genes, enzymes, chemical reactions, and pathways involved in plant metabolism. The database currently contains over 500 biochemical pathways consolidated from over 290 plant species, including more than 2,000 reactions, 3,000 enzymes, and 4,000 literature citations.

"Plants are the ultimate source of nearly all human food, either directly or as food for the animals we eat, and they also produce a large fraction of our medicines, fragrances, spices, and other useful products," said Peifen Zhang, director of the project. "They are far better biochemists than humans are or possibly will ever be. Now we have a reference database that brings all this essential information together in one place."

Wolf B. Frommer, interim director of the Department for Plant Biology, said, "We expect that this new resource will help improve crops for food and biofuels and it is very timely given the importance of metabolic engineering of crop plants in a world with increasing needs for these products."

In addition to PlantCyc, PMN will develop and host a collection of single-species databases such as AraCyc (Arabidopsis). These single-species pathway databases place the sequenced and annotated plant genomes in a biochemical context to facilitate the discovery of enzymes and the engineering metabolic pathways. The databases provide access to functional genomics data, such as those generated from microarray and metabolomic experiments. PMN is currently developing similar databases for important crop plants including poplar, soybean, wheat, and maize.

The network draws from many individuals with expertise in annotating genomes, generating metabolic pathway databases, curating biochemical information from the literature, and forming extensive networks with biological databases and biochemistry researchers.

PMN is expected to grow quickly as more plant genomes are sequenced and annotated and new biochemical data are published. Semi-annual releases will be used to incorporate the most up-to-date information.

Source: Carnegie Institution

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