

CALIFORNIA CITRUS NURSERY BOARD Final Report 2009

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Project Title: Extending Knowledge on Citrus Commercial Varieties and Related Citrus Germplasm

Project Objectives:

1. Convert the static CCPP and CVC web sites to data-driven dynamic sites for better administrative management and distribution of information to the user.
 2. Combine in a functional manner the three citrus collection databases of the Riverside citrus agencies. Harmonize activities, vocabulary, and formatting of the citrus information distributed to the industry.
 3. Enhance the CCPP and CVC websites with photographs, descriptions and variety evaluation data for all varieties available from the CCPP and initiate efforts to photograph all of the remaining accessions and digitize the historic card records for these accessions of the Citrus Variety Collection.
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Converting Static Websites to Data-Driven Dynamic Websites

Initially, a detailed analysis of the current types of data available in the static websites of CCPP and CVC was carried out. These websites contain text descriptions, pictures, numerical data of fruit characteristics and a level of categorization of the varieties. Two “MySQL” databases were designed; one for each of the CCPP and CVC, based on the content of the respective websites and a web management system was developed accessible only to the CCPP and CVC administrators for the maintenance of the data. In the second phase, the import of the vast amount of the fruit characteristics data into the database was addressed. The fruit evaluation data were stored in Excel files that have been created since 1994 and their manual insertion into the database would have been time consuming. An import utility that automated the process of moving the fruit evaluation data from the Excel files into the database was implemented. This utility includes an initial preprocessing step where the original data in the Excel files are cleaned from any inconsistencies (i.e. differences in date formats, measurement units etc). Subsequently, the fruit evaluation data are inserted into the database and become available to the CCPP and CVC administrators through their web management application.

In addition, a web interface for the public domain regarding the search and the comparison of the fruit characteristics was developed. The user can perform easily a customized search of the fruit evaluation data by selecting specific varieties, fruit characteristics (such as color, width etc.), harvest period / time period while extended data mining and statistical calculations are performed on the fly. The results are presented in a table format that makes easier their comparison and interpretation.

Finally, the two “MySQL” databases, the most important component of the this project, have the capacity to store not only the data that will be publicly available through the website application, but will also cover much more detailed information about the varieties that currently is used for internal research purposes. This information (such as diseases status, field locations, propagation history, and historical data of the varieties) is currently in Excel format that makes its management very insufficient. The main advantage of this scheme of database is its flexibility that allows the users – without the need of the database administrator – to add dynamically new fields for a table.

As soon as the CCPP and CVC administrators complete the data upload into the data base, the CCPP and CVC websites will be converted to a data-driven dynamic websites and all the static web pages for the individual varieties (around 500 html files in each site) will be replaced with a single dynamic web page that retrieves the information for each variety (photos, description, links, fruit evaluation data) from the database. The CCPP and CVC administrators can handle this variety information anytime through their web management system without the intervention of the database administrator. They can also control the privacy of the data configuring by themselves which information to be publicly available.

Connecting the Three Riverside Housed Citrus Collection Databases

The Riverside Citrus Database (RCD) was carefully designed to include the unique identifiers of the varieties and their corresponding public domain information, as defined by the three California Citrus programs (CCPP, CVC and NCGRCD), avoiding the duplication of the data between the databases at the same time. Moreover, a user management system was designed to control the privacy of the data of each of the three California Citrus programs. The web interfaces for the management of data and the public domain will be implemented as soon the administrators test and approves the database design and functionality.

Enhancing the CCPP and CVC Websites

Under the direction of Tracy Kahn and Toni Siebert and with assistance from David Karp, there have been numerous enhancements to the Citrus Variety Collection website (<http://www.citrusvariety.ucr.edu>). Over the past two years Toni Siebert determined which varieties available from the CCPP were not included in the CVC website. There are now descriptions for more than 200 of the varieties listed by the CCPP and many others that are heirloom varieties and valuable citrus germplasm for research. Many of the descriptions are now in the new format which includes the following: common variety name, scientific name, VI number (CCPP order number), CRC number (CVC accession number), PI number (Plant Introduction number), source, parentage/origin, rootstocks of accessions in the CVC, notes and observations and availability. There are also links to CVC evaluation data, the CCPP data and the USDA Germplasm Resources Information Network (GRIN) page when available. The varieties in the CVC website have now at least one photograph of the tree, whole fruit and/or cut fruit. There are additional accessions in the CVC collection that are not available through the CCPP that now have descriptions in the new format as well.

The accessions or varieties in the CVC are organized alphabetically, by "category" (sweet oranges, mandarins and hybrids, rootstock varieties, specialty varieties, etc.) and by those with evaluation data. There are 104 varieties listed with evaluation data dating back to 1996. Within the "category" organization there are also categories for "Varieties Developed at UCR" and "New Accessions by Year" which has all new accessions back to 2000.

For the past two years the CCPP in collaboration with the LREC personnel collected evaluation data from more than 60 different varieties in biweekly intervals during the set and maturation period of the fruit. In addition, more than 600 pictures of the tree, fruit, and fruit on the tree of over 200 varieties were also collected. These and older data (currently data from 2005 and 2006 are in place) are uploaded in the new dynamic "php" CCPP website developed with the completion of this project.