

FCDD: A Database for Fruit Crops Diseases

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Abstract:

Fruit Crops Diseases Database (FCDD) requires a number of biotechnology and bioinformatics tools. The FCDD is a unique bioinformatics resource that compiles information about 162 details on fruit crops diseases, diseases type, its causal organism, images, symptoms and their control. The FCDD contains 171 phytochemicals from 25 fruits, their 2D images and their 20 possible sequences. This information has been manually extracted and manually verified from numerous sources, including other electronic databases, textbooks and scientific journals. FCDD is fully searchable and supports extensive text search. The main focus of the FCDD is on providing possible information of fruit crops diseases, which will help in discovery of potential drugs from one of the common bioresource-fruits. The database was developed using MySQL. The database interface is developed in PHP, HTML and JAVA. FCDD is freely available.

Availability: <http://www.fruitcropsdd.com/>

Key words: Fruit crops, Diseases, Diseases type, Causal organism, Symptoms, Control, Database, Phytochemicals.

Background:

Fruits are good source of beneficial health effects, namely vitamins, minerals, trace elements, dietary fiber, proteins of vitamins. Here, we describe the development of a database containing information for fruit crops diseases improvement. Though a great deal of information has been acquired about fruit crops diseases, diseases type, its causal organism, images, symptoms, their control, possible sequences [1-2] and phytochemicals much of this information is highly dispersed and of limited accessibility, often being confined to specialized textbooks, obscure government documents or subscription-requiring scientific journals. Fortunately, over the past few years a number of web-accessible databases have started to appear, such as the pubchem and chembank phytochemical database and so on. They focus on providing information on

either chemical property, structure, ambiguous mode of action or only about the source of phytochemicals. A few databases were reported for biological applications, which are mostly focusing on particular aspects of dietary phytochemicals [3-4], which are based on experimental and published secondary data from the scientific reports. However, the lack information on fruit crops diseases, diseases type, its causal organism, images, symptoms, their control, phytochemicals. It is important to develop strategies to improve fruit crops diseases productivity. Fruit crop diseases improvement involves systematic monitoring of parameters essential for crop development. This could be achieved by developing databases containing information similar to many other crop databases [5-9]. This Fruit Crops Diseases Database (FCDD) was developed to be useful in finding effective chemical entities in drug discovery.

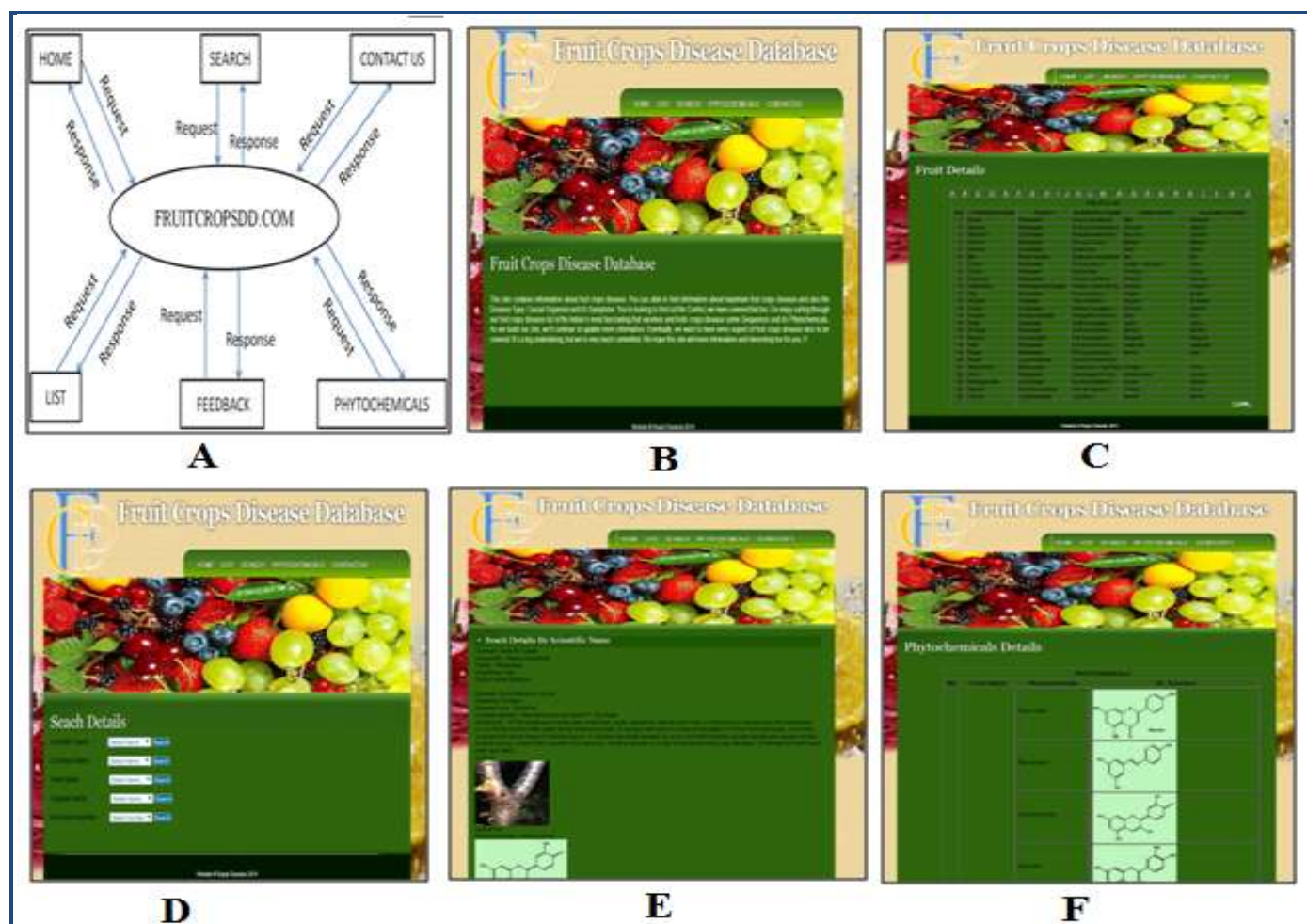


Figure 1: (A) Basic architecture of FCDD is shown; (B),(C),(D),(E),(F) A screen shot of the Fruit Crops Diseases Database (FCDD).

Methodology:

Data on fruit crops diseases, diseases type, its causal organism, images, symptoms, their control, phytochemicals, 2D images and their possible sequences were manually collected from online databases [1-4] and from peer-reviewed scientific articles and various literatures [5-9]. From 25 commonly consumed fruit crops in India, 162 details on fruit crops diseases, diseases type, its causal organism, images, symptoms, their control 171 phytochemicals, their 2D images and their 20 possible sequences were collected and this data was compiled using Microsoft Access®. The 2D molecular structures as .sdf file of the phytochemicals were rendered from online small molecular databases namely, Pubchem and ChEMBL. Primary **Table 1 (see supplementary material)** consists of twelve data fields (fruit crops scientific name, family, common name, hindi name, gujarati name, phytochemical, sequences, diseases type, its causal organism, images, symptoms and their control). Finally, data were exported from Microsoft Access® to Microsoft SQL server, which is used as the web interface. The front end of the database was designed constructed using PHP, HTML and JAVA and can be accessed at <http://www.fruitcropsdd.com/>.

Utility to the biological community:

The database finds utility in fruit crops diseases improvement. FCDD emphasizes the information of fruit crops diseases,

diseases type, its causal organism, images, symptoms and their control. It contains phytochemicals from fruits, their 2D images and their possible sequences also. The database finds utility to the scientific community for a quick review on the number of fruit crops diseases and phytochemicals for diseases research and provides enormous scope for development of drugs. The database is freely available in public domain.

Caveat and Future Developments:

The database website has a provision for updating and adding new in future by the database manager. All data fields will be curates and then accepted by the built in program. Database will be extended for phytochemicals present in fruits.

References:

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Supplementary material:

Table 1: Categories of typical search terms of FCDD

Search category	Query type	Search term	Example input
Scientific Name	Fruits scientific name and diseases details	Scientific name of fruits	<i>Malus domestica</i>
Common Name	Fruits name and diseases details	Common name of fruits	Apple
Hindi Name	Fruits hindi name and diseases details	Hindi name of fruits	Seb
Gujarati Name	Fruits gujarati name and diseases details	Gujarati name of fruits	Safarjan
Accession Number	Possible fruit diseases sequences	Accession number of sequences	E7EM08