PalmXplore - OIL PALM GENE DATABASE

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PalmXplore is an integrated database system that provides comprehensive tools to search, retrieve and browse the predicted African oil palm (*Elaeis guineensis*) gene information and its associated functional annotations (*Figure 1*). The oil palm gene models were predicted using a combination of gene prediction pipelines including FGENESH++ (Solovyev *et al.*, 2006) from Softberry and Seqping (Chan *et al.*, 2017) by Malaysian Palm Oil Board (MPOB). The system is also interoperable with data analysis options, such as BLAST search and the oil palm genome browser (MYPalmViewer; http://gbrowse.mpob.gov.my/). MYPalmViewer allows researchers to visually inspect and explore the information on the oil palm genome. PalmXplore provides a centralised resource to optimise use of oil palm genome data for molecular biology research. The database was developed as part of the Malaysian Oil Palm Genome Programme and can be accessed at http://palmxplore.mpob.gov.my.

THE PRODUCT

PalmXplore is a database of the African oil palm genes. The information deposited includes predicted genes, location of the genes on the oil palm genome (EG5-build) and their associated annotations derived from external databases, such as Pfam (Finn *et al.* 2016),

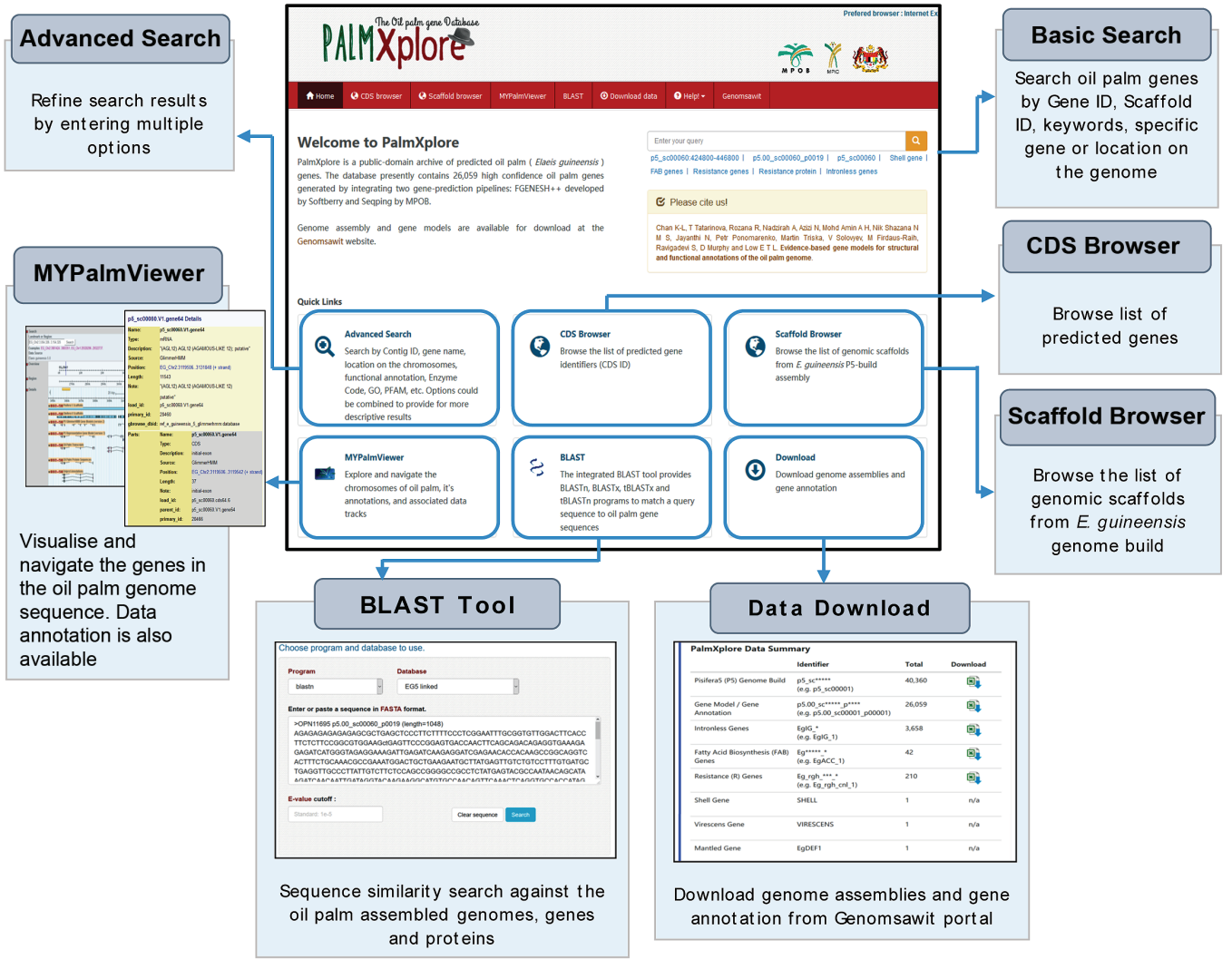

Figure 1. Snapshots of pages from PalmXplore.

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Gene Ontology (Gene Ontology Consortium, 2015) and KEGG (Kanehisa *et al.*, 2016). Information on genes related to important biological processes/traits, such as fatty acid biosynthesis, disease resistance, *SHELL* (Singh, *et al.*, 2013) and *MANTLED* (Ong-Abdullah *et al.*, 2015) are also available. The primary concept of PalmXplore is to provide a simple and easy access to the oil palm genes and its associated annotations. Results can be exported and downloaded in spreadsheet format. Sequence retrieval in FASTA format is also enabled by querying the DNA or protein sequences from the oil palm genome.

MATERIALS AND METHODS

The system uses the client/server architecture (*Figure 2*), whereby data storage and conceptual (back-end), and front-end are logically separated. The back-end of the system is organised as a relational model and stored in MySQL database (https://www.mysql.com/). The system was constructed by using PHP scripting language, HTML5, CSS3, JavaScript and Bootstrap3 (http://getbootstrap.com/), and runs on the Apache 2.2.15 (Unix) web server. The system uses Google Analytics (https://www.google.com/analytics) to track and report website traffic and user activities.

ACCESSIBILITY

PalmXplore has been made available to the public since 1 December 2016. No login or registration is required to access the data. PalmXplore is accessible at http://palmxplore.mpob.gov.my.

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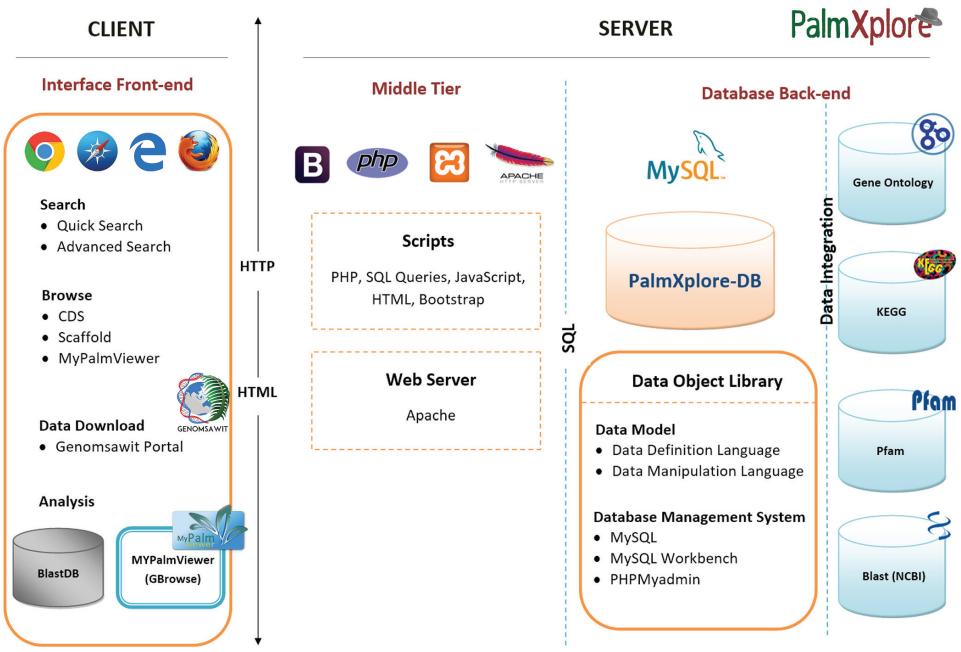

Figure 2. PalmXplore system architecture.

BENEFITS OF PalmXplore

- Efficient data storage, management and retrieval of the oil palm gene predictions and annotations
- Integration with bioinformatics tools aids in deciphering important biological information from the oil palm datasets
- Interoperability with Genomsawit portal provides comprehensive, integrated, updated and cost-free oil palm information

THE NOVELTY

PalmXplore is the first available gene resource depository and search engine dedicated to the oil palm genome.

For more information, kindly contact:

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