OPTRACKS 3.0: A WEB-BASED OIL PALM TISSUE CULTURE DATABASE SYSTEM

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The oil palm tissue culture (OPTC) process involves many stages that generate enormous amount of information starting from sampling of ortets, culturing of explants, calli, embryoids, polyembryoids, shoots, transplanted ramets and planting in fields. Every OPTC laboratory has its own way of collecting data, from the conventional manual entry into forms, spreadsheets and/or databases *etc*. In MPOB, a relational database management system simply known as the Tissue Culture Database System (TCDS) was used since 2000 on a standalone personal computer (Zamzuri, 2001). As it does not require programming skills, the tissue culture (TC) team customised the design of more than 30 database tables covering the whole TC stages and sub-stages. TCDS enabled related records from across different groups of data to be linked, of which desired information can be retrieved and subsequently printed in any form for reporting purposes. The real power of a database is the ability to visualise data in as many ways possible through the use of query. In fact, the ability to perform queries is the key reason for using a database management programme to manage large amounts of related data, rather than being limited by spreadsheets or word processing softwares. Queries allow questions to be asked about the data and required information extracted from tables whilst providing the freedom to update the selected data in various ways. As the databases grew in size the system suffered from speed performance issues. This then triggered the migration to a MS SQL Server. This move simplified things further as it was easy to place a database on a client-server architecture and have multiple users share and update data without overwriting each other's inputs (Tarmizi *et al.*, 2003).

PROBLEMS

Despite the first generation TCDS performing well especially for users without programming
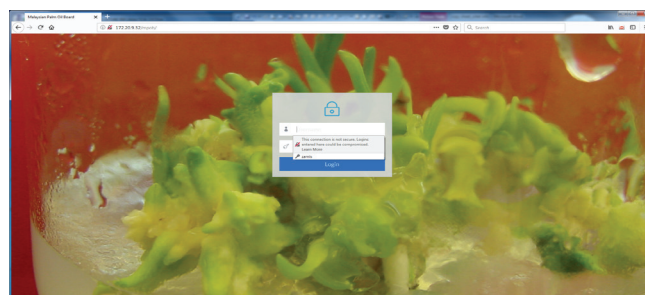

Figure 1. OPTRACKS 3.0 opening screen.

skills, its limited memory space, sluggish speed and single user system were the main drawbacks as data input kept growing. Then the second generation upgrades were introduced via a client-server system, also known as OPTRACKS 1.0 and 2.0, which accommodated more users and memory space but resulted in dependency on the vendor or a programmer. This latter issue certainly would incur more cost and time taken for modifications or additions to be incorporated into database tables and query or report formats.

OBJECTIVE

To develop and manage the oil palm tissue culture database via a web-based architecture system that can be accessed and mined regardless of place, time and programming skills.

BENEFITS

- Collect, manage and access information via a web-based system at all times anywhere (authorised personnel only).
- Monitor production or research progress anywhere and at anytime through result analyses.
- Quick check on information for errors.
- Perform advance queries and generate customised reports even on the fly by non-programmers.
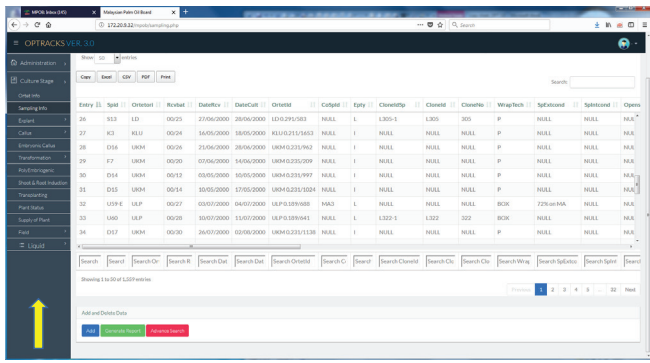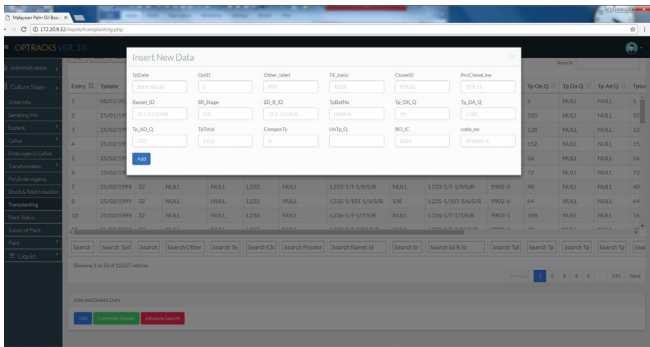
Figure 2. A database table.

Figure 3. Filling data form.

OPTRACKS 3.0

Opening Screen

OPTRACKS 3.0 was installed at an existing server hosted by the Breeding Group (ABBC). Via a web address, the following screen will display as in *Figure 1*. Only authorised personnel are allowed to open, key-in or edit and use the system.

Database Table Screen

Upon entering the database, a list of TC stages on the left side of the screen will appear (indicated by an arrow). By selecting one of them, a spreadsheet-like screen with rows and columns will be displayed. The 'row' represents a particular record while the 'column' represents a field name or variable. Each record in a table contains information about an individual item such as a specific TC stage. The records are made up of fields (displayed as columns), such as sampling no., date of culture, operator code and *etc*. (*Figure 2*). Entering new data is made-easy with a guided filling procedure via a bootstrap mode (*Figure 3*).

Converting Data into Different File Formats

By clicking the Excel button on the top left of the screen, data can be converted for either analyses or simple reporting as in *Figure 4*. This format can then be converted into MS Access file for advance query across several database tables as in *Figures 5* and *6*.

Generating Data Report

Creating a report is an effective way to present data as a printed document. Reports give
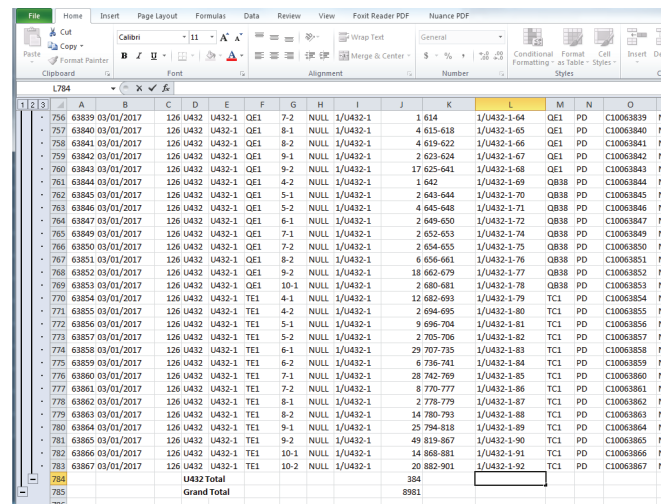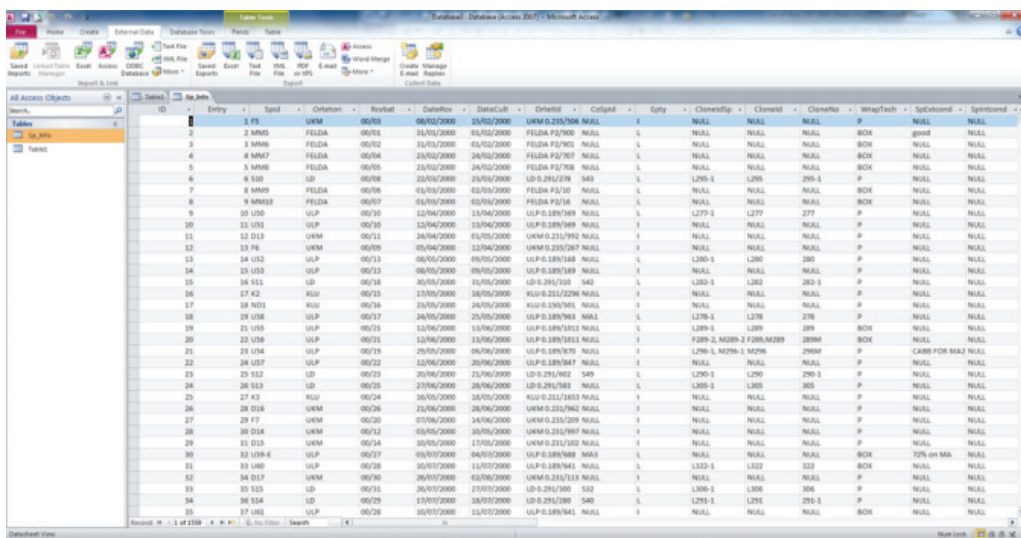

Figure 4. Converted data in Excel file.

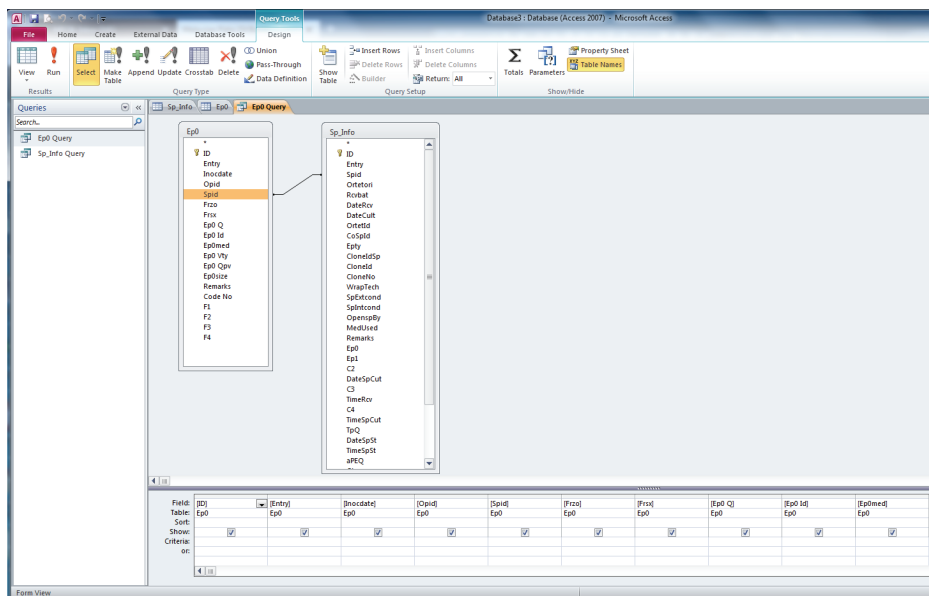Figure 5. Converted into Access file.

Figure 6. Query across two tables.

(C1) PE_SD culture Query 2- Monthly Report

Clone	PEscDate	bPE_ID	OpID	bPEvQ	aPEvQ	MR	clum	aPEvTy	aPEmed	aPE_ID	aPEscNo	SDvQ
L255												
	16-Aug-01	L255-1/33T-1/9	29	38	47	1.24	1	FL	SP	L272-1/33T-1/10	10	3
	24-Aug-01	L255-1/33T-2/9	23	14	24	1.71	1	FL	SPN	L255-1/33T-2/10	10	3
	27-Aug-01	L255-1/41T-2/10	15	111	110	0.99	1	FL	SP	L255-1/41T-2/11	11	15
	28-Aug-01	L255-1/37T-2/10	21	38	100	2.63	1	FL	SP	L255-1/37T-2/11	11	4
	Sub Total:			201	281	1.64						25
L272												
	01-Aug-01	L272-1/4T-1/9	2	41	71	1.73	1	FL	SP	L272-1/4T-1/10	10	7
	01-Aug-01	L272-1/8T-1/9	23	71	122	1.72	2	FL	SPN	L272-1/8T-1/10	10	16
	02-Aug-01	L272-1/153T-1/3	23	11	32	2.91	1	FL	SPN	L272-1/153T-1/4	4	0
	02-Aug-01	L272-1/154T-1/3	23	7	19	2.71	1	FL	SPN	L272-1/154T-1/4	4	0

Figure 7. Customised report.

more control over how the data is displayed and greater flexibility in presenting summary information. Reports are also an efficient way to print information that is used regularly. Firstly, a template for report is designed and saved and will be used for generation of future reports. *Figure 7* shows a monthly report of polyembryoid cultures with calculated values of certain variables.

CONCLUSION

OPTRACKS 3.0 is useful in organising and managing OPTC data even by personnel with non-programming skills through a web-based platform. This is to cater to the dynamism and advancements in both research and production aspects of OPTC. It will be useful for future integration with other databases, data tracking and data mining systems in oil palm research.

REFERENCES

Hashim, H (2008). Electronic tracking system (OPTRACKS 2.0). *Creative System Consultant Manual*. p. 1-30.

Tarmizi, A H; Zamzuri, I and Hashim, H (2003). Oil palm tissue culture tracking system (OPTRACKS): Version 1. *MPOB Information Series TT No. 185*.

Zamzuri, I (2001). Tissue culture database system (TCDS). MPOB Viva No. 184/2001 (51).

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