Weed Management in Processing Vegetables

A Data Management Plan created using DMP Assistant

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Template: Portage Template

Project abstract:

The research will examine the tolerance of several vegetable crops (ie. tomato, pea, snap and lima bea, carrot and cucumber) to a number of herbicides not currently registered in those crops, with the intention of supporting new and existing minor use registrations. In addition, weed control with various tank mixes will be examined to determine their best fit with existing herbicides. Each trial will be repeated on various soil types under differing environmental conditions, and applied to a range of commercially grown cultivars.

Identifier: 7584

Last modified: 01-03-2022

Grant number / URL: UG-T2-2021-101492

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Data Collection

What types of data will you collect, create, link to, acquire and/or record?

All data (ie. weed control, crop injury, crop dry weight, crop yield) are numeric.

What file formats will your data be collected in? Will these formats allow for data re-use, sharing and long-term access to the data?

Data are all numeric, collected by hand, and entered into the ARM software. The files are stored as .dat files, which are the equivalent of .txt files. These .dat files can be ported directly into Microsoft Excel.

What conventions and procedures will you use to structure, name and version-control your files to help you and others better understand how your data are organized?

Naming convention for all data files is a 6-character, alphanumeric code. The first two characters indicate the crop, the second two characters indicate the year, the last two characters indicate the trial number for that crop in that year.
As an example - LB21T1 - LB (lima bean), 21 (year 2021), T1 (trial 1).

Each data file is arranged in columns, with the following headers:
plot #, replicate, crop injury, weed control, crop dry weight, crop yield

Documentation and Metadata

What documentation will be needed for the data to be read and interpreted correctly in the future?

Study information: experimental design, plot size, site maintenance, planting dates, treatment dates, data collection dates are all recorded and stored in each .dat file.

Data-level descriptions:
A. Crop injury and weed control data are percentages of the untreated check. These are accurate to +-5%. Both are collected visually from the entirety of each plot.
Crop injury data are collected in one of two ways, depending on the treatment method.
1. For treatments applied before a crop has emerged, crop injury data are collected at 7, 14 and 28 days after crop emergence. In this case, the crop injury data will be labelled as injury7, injury14, or injury28 DAE (DAE - days after emergence).
2. For treatments applied after a crop has emerged, crop injury data are collected at 7, 14 and 28 days after treatment. In this case, the crop injury data will be labelled as injury7, injury14, or injury28 DAT (DAE - days after treatment).
Weed control data are all collected at 28 and 56 days after treatment. These columns will be labelled control28 and control56.

B. Dry matter data are collected by harvesting crop dry matter from two 1-m2 quadrats per plot, and measured on an analytical scale after samples are dried to a constant weight. These are accurate to the nearest 0.1g. This column will be labelled as dry_weight.

C. Yield data are collected by harvesting 5 meters of two rows of crop in each plot. The harvested material is weighed on an analytical scale. The yield per plot is converted to yield per hectare, and stored as an additional column in the .dat file. These columns will be labelled as plot_yield and total_yield, respectively.

How will you make sure that documentation is created or captured consistently throughout your project?

All data are collected according to an Excel schedule created by the PI. This schedule is organized by the 6-character trial names, within which each of the data-level descriptors are listed, with the date of collection. Crop injury and weed control data are collected by the research technician, according to this Excel schedule, dry weight data are collected by the summer students under the supervision of the technician, and yield data are collected by created by the technician and summer students. Data are collected by hand, on prepared data collected sheets that are generated by ARM. The data are then entered into each .dat file in ARM.

If you are using a metadata standard and/or tools to document and describe your data, please list here.

All data are stored in Agricultural Research Manager, and collected according to the Excel schedule mentioned above.

Storage and Backup

What are the anticipated storage requirements for your project, in terms of storage space (in megabytes, gigabytes, terabytes, etc.) and the length of time you will be storing it?

Maximum file size for each .dat file is 1MB. These are text-based files and don't require very much memory. We store each file indefinitely.

How and where will your data be stored and backed up during your research project?

Data are stored in three locations. There is a separate drive dedicated to the Weed Science team - our I:drive - on which all files are stored. These files are automatically backed up every Friday afternoon. Data are stored in this drive indefinitely.
The .dat files are also stored on my desktop computer (indefinitely), a backup external hard drive (indefinitely), and the research technician's desktop computer (indefinitely).

How will the research team and other collaborators access, modify, and contribute data throughout the project?

The research technician accesses, modifies and contributes data only to the I:drive version. The copies on our desktop computers and the external hard drive are updated by automatic backups occur every Friday afternoon.

Preservation

Where will you deposit your data for long-term preservation and access at the end of your research project?

Data are stored in the I:drive for long-term preservation and access at the end of the research project.

Indicate how you will ensure your data is preservation ready. Consider preservation-friendly file formats, ensuring file integrity, anonymization and de-identification, inclusion of supporting documentation.

All files are stored as .dat files. The file is easy to access with either ARM software, or Microsoft Excel. Again, these .dat files are text files, which can be opened in Excel using the Import function as a .txt or .csv file, depending on the user's preference.

Sharing and Reuse

What data will you be sharing and in what form? (e.g. raw, processed, analyzed, final).

We typically only share analyzed data with the funding agency; however, the .dat files are also made available upon request.

Have you considered what type of end-user license to include with your data?

There is no intellectual property associated with the data.

What steps will be taken to help the research community know that your data exists?

All data are published in final reports to the various stakeholders that have funded the project. As well, papers are published in peer-review journals. We typically publish in journals such as Canadian Journal of Plant Science and Weed Technology, which assign DOIs to these data sets.

Responsibilities and Resources

Identify who will be responsible for managing this project's data during and after the project and the major data management tasks for which they will be responsible.

The research technician has responsibility for managing project data during the project, and for saving the data files on the I:drive, and their desktop computer. The PI accesses the files to store them on their desktop and external drive, and is responsible for making the data available to external stakeholders when requested.

How will responsibilities for managing data activities be handled if substantive changes happen in the personnel overseeing the project's data, including a change of Principal Investigator?

In the event that the research technician is unavailable, the PI will handle oversight of project data, and vice versa. In the event that neither is available, the I:Drive and back-up versions of the files can be accessed by the departmental IT personnel.

What resources will you require to implement your data management plan? What do you estimate the overall cost for data management to be?

We currently have the resources necessary to implement the data management plan. Overall cost will include updating the license for ARM software for the lab, which is approximately $500 per year.

Ethics and Legal Compliance

If your research project includes sensitive data, how will you ensure that it is securely managed and accessible only to approved members of the project?

The project does not include sensitive data.

If applicable, what strategies will you undertake to address secondary uses of sensitive data?

Not applicable.

How will you manage legal, ethical, and intellectual property issues?

The project will not include development of intellectual property.