How to produce a 'Scientific Poster'

Depending on the competition topic, required tasks and your year level (see your current competition guidelines), you may be asked to design a **'Scientific Poster'** to present your research and findings about an experiment you've completed.

Poster settings and layout

Scientific posters are usually designed electronically, using programs such as Microsoft PowerPoint (or specific desktop publishing programs) and are presented in the following format:

- One (1) single page (not double sided)
- Page direction set to 'portrait'
- File saved to PDF for ease of transferring to peers/teachers for review and for ease of emailing to commercial printers for printing at the required size (A0 for most industry conferences). **However, for our competition you only need to print posters to A4 or A3 size (to suit standard laser printers).**

Just like scientific reports, scientific posters usually contain the same heading structure and contain minimal important information, photos, graphs and diagrams that summarise your experiment findings and research:

- **Title** (experiment title)
- **Author/s** (list the student/s involved, year levels and school name, plus a photo of the author(s) if permissions allow)
- **Introduction** (aims/hypothesis of the experiment, background research on the topic)
- **Materials and methods** (how you set up the experiments/activities and the materials used)
- **Results** (summary of observations, table/graph of the results, diagrams, photos)
- **Conclusion/Discussion** (interpretation and explanation of the experiment results)
- **References** (list of reference materials used in your research)
- **Acknowledgements** (list of people who assisted you, eg, your teacher, classmates, school gardener, parents, farmers or professionals you may have interviewed)
- **Contact information** (your name (if permissions allow), year level, school name, school phone number, school logo/emblem)

Our DAF researchers regularly prepare scientific posters about their current research projects and experiment outcomes for presentation at local, national and international conferences, meetings and workshops (see example on next page).

We would like you, as Australia's future scientists and agriculturalists, to develop skills in presenting your own research projects in 'scientific poster' format too!

Hints and tips

- As space is limited, be selective in the content. Include only minimal, but important information that summaries your research/findings well. Make sure you add photos, graphs and diagrams to explain your work. This will also increase the visual appeal of your poster.
- Don't make your poster too cluttered, busy or difficult to read – be careful with your colour scheme, font style and the quality and layout of images and text. Sometimes less is more! It is common to reduce the font size of the references, acknowledgements and contact information sections and be sure to label each photo/graph/diagram with numbered captions such as 'Figure 1: …' (in a smaller font size). You should make reference to your figures within your text.
- Photos used should be a minimum of 300kb in file size. At this resolution (or higher), photos should print clearly (not too pixelly) at A0 poster size.
- Your poster may become very large in file size, particularly if you have included high resolution photos, diagrams or other imported objects. You may need to convert the file to a '.pdf' which will dramatically decrease the file size and make it easy to email or share with others (and the print quality will still be high).
- If you wish to print out and proofread your poster, make sure your printer settings are set/or scaled to an A4 or A3 page. If you wish to print your poster to A0 size, you may need to send your file to a commercial printing company.

Example of a Scientific Poster produced by Nikki Seymour, Senior Soil Microbiologist, DAF Leslie Research Facility, for the 2016 Australian Pulse Conference

New evidence on the effectiveness of native and commercial rhizobium strains for mungbean

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Introduction

Cultivation of mungbeans in many parts of Queensland could benefit growers by increasing the value and profitability of primary production both through direct sales of seed from this high-value crop, and/or through potential residual fixed nitrogen. Simplifying the operations involved in growing mungbeans, including rhizobium inoculation, may encourage more farmers to include them in their farming system. Anecdotal reports have suggested that native rhizobia are as effective as commercial inoculum for mungbean in the Burdekin region of far north Queensland. This study aimed to isolate and compare native rhizobia with commercial strains used in inoculums.

Methodology

Whole mungbean plants were collected from two sites in the Burdekin catchment area of north Queensland in November 2015. Uninoculated mungbean plants were collected from a site with a cropping history that did not include legumes. Inoculated plants (Group I, CB1015 inoculum) were collected from a different site where mungbean had been been grown 6 years prior, followed by sugarcane. Plants from both sites were at the mid- to late-flowering growth stage. Ten nodules were collected from each of 4 plants from each Burdekin site for testing protein profiles by MALDI-TOF MS (Mabritec) (Zeigler et al. 2015). Reference culture plates of CB1015, CB756 (the previously recommended commercial inoculum) and CB1809, used to inoculate soybean. An additional ten nodules from each of 4 plants were used to establish cultures on Yeast Mannitol Agar. Nodules from mungbean plants grown in soil from near Millmerran on the Darling Downs were also collected. This site had never grown legumes and had never been inoculated. Five nodules were collected from each of six mungbean plants at the early- to mid-flowering stage.

Following rhizobia identification in nodules from the various sites, a glasshouse experiment was conducted using the dominant types. Five treatments were applied to three mungbean varieties (Crystal and Jade which are both green gram and Regur, a black gram), grown in sterile sand and vermiculite soil. Treatments were: uninoculated, uninoculated with added nitrogen, CB1015 inoculum added, Cluster 9 and Cluster 5 rhizobia. At six weeks plants were assessed for top dry weight, root dry weight, number of nodules and nodule dry weight. Nodules were collected for assessment by MALDI-TOF MS, and plant tops analysed for ^{15}N analysis.

Results

Principle component analysis of the MALDI-TOF MS results, showed multiple clusters of like species found in the nodules, but 2 were dominant, Cluster 5 and Cluster 9. Some nodules from the inoculated plants did contain rhizobia that clustered with known CB1015 rhizobia (Cluster 7) (Figure 1).

All nodules from inoculated plants in the Millmerran soil were identified as CB1015. Uninoculated plants from this site did not nodulate.

Inoculation with Bradyrhizobia clusters 5 and 9 gave similar shoot biomass, nodulation and N fixation as the commercial strain CB1015 (Figure 2).

Nodules collected from the plants inoculated in the glasshouse experiment contained the same rhizobia strains as they were inoculated with.

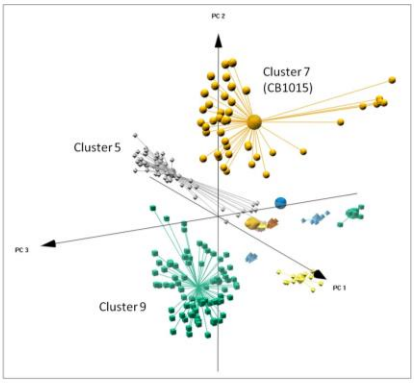

Figure 1. Principal component analysis of MALDI-TOF MS spectra from *Bradyrhizobium* collected from mung beans from two sites in the Burdekin catchment area of north Queensland.

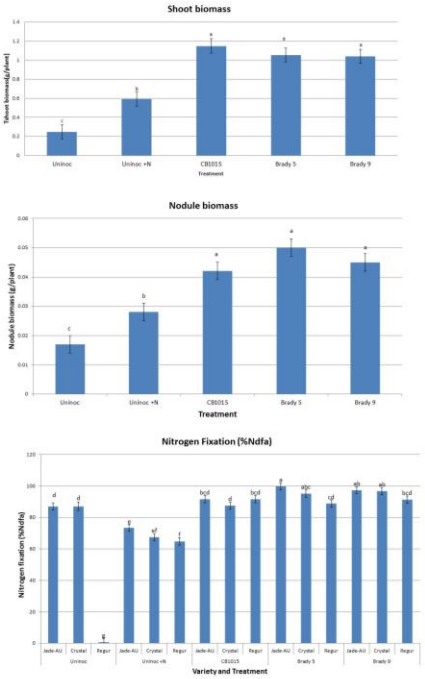

Figure 2. Shoot biomass, nodule biomass and nitrogen fixation (%Ndfa) in mungbean plants inoculated with Bradyrhizobia Clusters 5 and 9, and CB1015 compared to uninoculated plants

Conclusions

These results support the theory that native rhizobia are as effective at promoting growth and fixing nitrogen in mungbeans as the commercial strain in some parts of Queensland. However, further investigation of the distribution, effectiveness and pervasiveness of these native rhizobia is required before any major practice change could be recommended. The application of commercial inoculum is necessary for a healthy crop in other parts of Queensland, and may still be considered a useful "insurance policy" to ensure healthy nodulation of mungbean crops in the Burdekin catchment area

References

Ziegler D et al. (2015) Ribosomal protein markers provide root nodule bacterial identification by MALDI-TOF MS. *Appl Microbiol Biotechnol* 99:5547–5562

Queensland Government