PROGRESS REPORT ON PROJECT SUPPORTED BY A PADDY PALLIN FOUNDATION SCIENCE GRANT

Instructions to project leaders for completing this form

Progress reports are required to be submitted 12 months after the start of the project, and then final report submitted after 18-24 months. Only a limited or nil response to section 4 is expected for the first progress report.

Note that during the first month of the grant, material for the Foundation's web site must be provided. Payment of the first grant installment is contingent upon the receipt of this material. Updates are to be provided during the tenure of the grant, and at the time the final report is submitted.

Payment of the final grant installment is contingent upon receipt of the final summary which is to summarize the outcomes of the project during the tenure of the grant.

Researchers please note:

The progress report must be completed by the Project Leader (generally the first- named researcher in the original Grant Application).

The Project Leader may need to seek and enter contributions from other parties involved in the project where required. l While there is no limit to the textual information that can be provided, the Foundation is generally seeking a maximum of half a page of information where a textual response is required.

Once complete, the Project Leader should email the report to the Secretary of the Paddy Pallin Foundation Science Grants Committee, Dr Peter Banks, at peter.banks@sydney.edu.au (Please send the electronic copy even if the Administering Organisation requires it to be submitted via the Research Office. This facilitates distribution to the other members of the Research Committee for review and approval).

The file name for the Progress Report should conform to the following naming convention: [Project ID][ProjectLeaderSurname][Rep#] (For example PPFSG2014-0703SmithRep1).

At the time of submission of the Progress Report the Project Leader should contact the accounts department of the Administering Organization and request that a tax invoice for the next grant installment be raised and sent to the Executive Officer, Royal Zoological Society of NSW, PO Box 20 Mosman 2088

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Report Type (12 month/ Final)	Date Submitted
Progress report	19/09/2016

1. PROJECT IDENTIFICATION

1.1 Project Title

The Koala (*Phascolarctos cinereus*) Faecal Bacterial Microbiome; Does Change in Diet Impact Community Structure?

1.2 Administering Organization

Western Sydney University (formerly known as University of Western Sydney)

1.3 Project Leader

Name: Kylie Brice
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Work Phone Number:
Mobile Phone Number: 0413994013

2. PROJECT DESCRIPTION & OBJECTIVES

2.1 100 word Project Summary

My project investigated the gut microbes of 33 koalas from Cape Otway, using DNA extracted from faecal samples. I have identified significant differences in the community structure and abundance of the dominant gut microbes within one population of koalas known to eat two different eucalypt species. These results will be used to develop individualised gut microbial inoculants for translocating koalas or those released after rehabilitation to increase survival rates.

2.2 Summary of original objective of the Project

My objectives were to confirm the gut microbiome results obtained through sequencing extracted faecal DNA from 33 koalas, and to quantify the difference observed using an established molecular technique known as qPCR (quantitative polymerase chain reaction).

3. PROJECT OVER DURATION OF FOUNDATION GRANT

3.1 Have there been changes to the project? (yes)

This could include changes to the research Project resulting from funding being at a lower level than requested. By indicating changes to the budget , aims and research plan in the Report, you are requesting approval from the Research Grants Committee for a revision of the Project. A 'satisfactory' assessment of the Report and the Project by the Research Committee means that the revision has been approved.

If Yes give details

I was able to carry out the work I had originally included in my application under the budget I had originally estimated. Therefore, I have included samples collected from a population of koalas located in the Blue Mountains. I was able to quantify the relative abundance of bacteria in these DNA samples, providing a value-added component to the original grant proposal. In addition, I trialed a pilot investigation to identify differences in leaf morphology, unfortunately this avenue of research has not yet resulted in useful differences being observed.

This work is extremely exciting as it is the first time community structure of gut microbes has been investigated in koalas, therefore, it will contribute significantly to the koala's management, especially if koalas are relocated due to over abundant populations causing over-browsing of food trees, such as seen recently at Cape Otway, or after they have been released form care. Both of these situations can contribute to mortality in koalas that I believe could be significantly reduced through the development of faecal inoculants that would be given prerelease.

3.2 What were your research plans and objectives for the period covered by this report?

(The answer to this question should be consistent with the original Application or the preceding Progress Report).

My research plans were to clone the bacterial species identified through NGS from the 33 koala faecal samples, which would act as the standards required for qPCR. Then to run 500 qPCR reactions, analyse the data and compare the relative abundance of the bacteria from qPCR to the NGS results. Depending on the results obtained from qPCR I was planning to use the data to write a manuscript for publication this year.

3.3 Did the research project proceed as planned? What have you achieved over this period? Outline the research findings to date.

Yes it proceeded as planned, I was able to quantify the relative abundances of Bacteroidetes and Firmicutes and confirm the NGS results were accurate. Additionally, I was able to quantify and confirm the NGS results for a population of koalas in the Blue Mountains, which has allowed for a comparison of the community structure of koala gut microbiomes across geographic locations. I am expecting the first publication including the data obtained from this work, to be submitted to the ISME journal for review by the end of 2016. This data will contribute to chapters 1 and 3 of my PhD thesis.
The leaf morphology analysis outlined above will contribute to a second publication and chapter 2 of my PhD thesis.

3.4 Have you experienced any difficulties that have affected the progress of the research project? (yes/no)

No

3.5 What are your research plans and objectives, including publication plans, for the coming year? *(Please note that in your next Report you should report progress against these plans and objectives)*

I plan on submitting my first article for review by the end of 2016

Title: The koala (Phascolarctos cinereus) hind gut bacterial microbiome differs with diet.

I am writing up my PhD thesis at the moment.

Title: The koala (Phascolarctos cinereus) faecal microbiome: Does change in diet impact community structure?

I have started writing the second article that will include the qPCR and possibly leaf analysis funded by this grant.

Title (preliminary at this point): Metagenomic analysis of the hindgut of the koala (Phascolarctos cinereus).

I am planning on continuing and finalising the leaf analysis mentioned above with the remaining funds. As I have been encountering problems with this pilot study I may need to pay for expert assistance to help me to get it working.

4. ACADEMIC OUTPUTS

4.1 Publications and other academic outputs directly related to this project. *(Please list all publications and those manuscripts accepted for publication, for the period covered by this report)*

Publication 1title: The koala *(Phascolarctos cinereus*) hind gut bacterial microbiome differs with diet in a wild koala population.

Thesis title: The koala (*Phascolarctos cinereus*) faecal microbiome: Does change in diet impact community structure?

Publication 2 title (preliminary at this point): Metagenomic analysis of the hindgut of the koala (*Phascolarctos cinereus*).

4.2 Evidence of scholarly impact and contribution. Is there evidence that this research project is having/has had and impact in the research field or the broader public domain? (yes/no) not at the moment

If yes, give details *(For instance, standard citation data on articles published in ISI journals, citations to books, re-publication, other invitations, newspaper/media/expert commentary).*

Not yet relevant

4.3 End-user interaction and other project outcomes If there are examples of the impact of this research Project not covered in item 4.2 above please provide details. For example, introduction or modification of standards/protocols, preparation of proposals for funding from other agencies as a result of outcomes from this project.

Not yet relevant

However, the findings through my PhD project and sponsored by this grant, will contribute to my supervisors long term ARC grant “Understanding the koala microbiome: unlocking the secrets of koala health and dietary specialisation and successful husbandry and translocation” by laying the foundations to the development of faecal inoculations, which will contribute in the long term to koala conservation. This is particularly relevant at this time as the koala’s threatened status has just been reviewed and listed as vulnerable.

5. ATTACHMENTS & OTHER MATERIAL

Please provide , as separate files, any figures, graphs, images and other material that cannot be included in this form. Please also provide updated material (text and images) that can be used to revise your project summary on the Foundation's web site. Please provide text in Microsoft Word format and images in JPEG format with a minimum size of 600 x 400 pixels. If this is the final project report, the web page summary must be updated to reflect the outcomes of the project. Is any material being forwarded as additional attachments ?