

From the editor

HUW MORGAN

Welcome to the Winter 2015 issue of *Australasian Plant Conservation*! This issue provides a suite of articles exploring the theme *Community Projects and Citizen Science*. For plant conservation projects requiring lots of hands and eyes, a coordinated and dedicated team of volunteers is often the best or only solution for ensuring project goals are realised. Articles in this issue provide a range of examples of skilled amateurs and passionate science-minded community members making important, profound and lasting contributions to the conservation of Australian native plants. This issue also contains the fourth instalment of **Dan Cole** and **Greg Siepen's** large scale reforestation series focusing on maintenance of new biodiverse plantings.

On behalf of the team of hard-working and talented office staff (**Jo Lynch** and **Carly Westbye**) and APC graphic designer (**Siobhan Duffy**), along with the ANPC Committee, I am pleased to welcome you to the first issue of the new-look *Australasian Plant Conservation*. We hope you enjoy the new layout which was designed to present a more contemporary style for the bulletin, as well as provide easier to read text and clearer headings. The new layout has also allowed our design team to fix a couple of technical shortcomings in the previous style – ultimately saving time and the sanity of those behind the scenes.

This issue marks a further milestone for *Australasian Plant Conservation*, as it will be the last for which I am Editor. With the ongoing demands of a young family and a day job, I have made the decision to step down from the humble Editor's word processor to realise extra time with my family and the bush. Taking on the Editor's role has been a fantastic experience – I have enjoyed it greatly and will look back on it with fondness. To the wise and supportive ANPC Committee members, and particularly to the bulletin team, I offer my sincere and warm thanks and very best wishes.

It is my pleasure to announce that the incoming Editor of *Australasian Plant Conservation* is **Paul Adam**. Paul is a pillar of native plant ecology and conservation research in Australia, and will bring a wealth of experience, knowledge and enthusiasm to the bulletin. Paul has particular expertise in the ecology of coastal plant communities, Australian rainforests, pollination, urban bushland and threatened species. He will make an excellent Editor and *Australasian Plant Conservation* and its readers will benefit immensely.

I wish you excellent reading!

Citizen science: Community monitoring of Marri canker disease

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Introduction

A successful citizen science project requires three primary components. First, a compelling research topic focused on an issue comprehensible by the broader community; second, an engagement strategy that communicates the issues and creates partnerships with scientists and the community; and third, efficient, flexible technology to implement the program.

Information is a key output of a successful citizen science project. Not only must the data be of high quality when captured but they must be easily accessible subsequently to both contributors and scientists. For community members this completes a feedback loop, allowing them to see the results of their efforts in a broader context. For scientists, the data must be available in a form fit for further analysis.

In this article we present the Marri Canker Project as a case study that:

- Addresses a specific environmental issue of interest to both researchers and the broader community.
- Engages with passionate community members who advise, learn and contribute data from the field.
- Utilises a smartphone app to aid identification and facilitate data capture in the field, improving both the quantity and quality of data being contributed to the project.

Background

Marri (*Corymbia calophylla*), an iconic, keystone tree species of woodlands and forests in the southwest of Western Australia, is suffering a major decline associated with the canker fungal pathogen *Quambalaria coyrecup* and the foliar pathogen *Q. pitereka* (Paap et al. 2008). Marri plays a major ecological role as a food source, habitat tree and refuge for numerous vertebrate and invertebrate fauna including the endangered Carnaby's Cockatoo (*Calyptorhynchus latirostris*), as well as being a key species for honey production in southwest Western Australia.

Attack by the canker fungus (*Q. coyrecup*) causes the death of areas of bark and the cortex tissue below that, resulting in cankers – localised areas of dead bark and wood. Cankers can be present on trunks, branches and twigs of trees of all ages. As the attack progresses, cankers girdle the affected limb or trunk, resulting in the death of the branch or entire tree. Diseased parts are also weakened to a point where they can be impacted by storms, with branches snapping or trees being blown over at the compromised canker site.

The foliar fungus (*Q. pitereka*) causes shoot blight in new shoots, leaves and flower buds, resulting in death of these tissues. This has serious implications for recovery of trees post-fire, and nectar and seed production for both native fauna and the WA beekeeping industry.

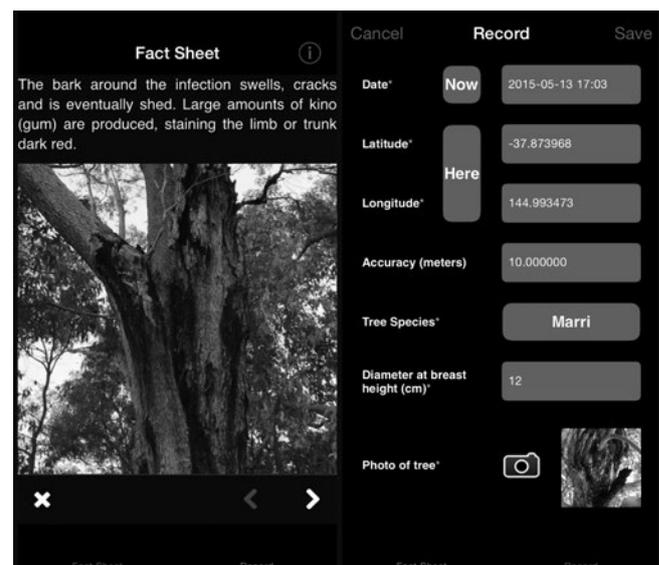
The impact of these pathogens is causing increasing concern across the community, and there has been substantial impetus and support from local communities to develop methods to manage these pathogens in the landscape.

The Marri Canker Project

In the Margaret River area, the Cape to Cape Catchments Group (CCG), local landowners and researchers from Murdoch University's Centre of Excellence for Climate Change, Woodland and Forest Health are collaborating to trial potential treatments for the canker disease. In 2014, seven trial sites were established by the CCG group together with local landowners. Each trial plot

contained 80 canker-affected Marri trees. Within these plots, treatments of phosphite and nutrient implants were applied to diseased trees, with the aim of providing a 'health boost', enabling the trees to fight disease and halt disease progression. Treatments were applied by the landowners with assistance and training from scientists. The results from these trials will enable scientists to develop a better understanding of the effects these treatments have on the pathogen. Given the effort required to apply these treatments, this approach is considered an interim measure while researchers continue to investigate more viable long-term options.

In addition to these intensive treatments, a smartphone application called The Marri App was collaboratively developed by the Eastern Metropolitan Regional Council, Murdoch University and Gaia Resources to assist collection of Marri canker data by citizen scientists. The Marri App helps citizen scientists to identify and record disease symptoms on Marri, with embedded fact sheets providing users with images and information on the identification of cankers and shoot blight. The app can also be used to record the presence of healthy trees, adding further information to the database. The app captures GPS location, incidence and severity of cankers on trees, and also lodges photographs and other site information to a central data repository, providing valuable additions to current knowledge on the incidence of this disease. Citizen science volunteers can view their data in context with all the other contributions to the project via the project's Biological Data Recording System (BDRS) data repository, while scientists can manage, review and download all data.



Screenshots of The Marri App illustrating aspects of the fact sheet and data recording functionality.

Marri Canker Project results

Since its launch in December 2013, 138 registered users have contributed 366 observations from a range of regions across the southwest of WA. These comprise 335 trees across 31 sites. Over 300 images have also been submitted, providing documentation of the disease, a reference point for correct diagnosis, and a potential baseline for measuring the outcomes of subsequent treatments.



Locations where The Marri App has been used to collect information on marri canker presence.

Discussion

Impetus for developing the Marri Canker Project came from members of the community who were observing decline in their local Marri populations and calling the plant pathologists at Murdoch University – already researching the disease – seeking answers and potential treatments. In this way it was a grass-roots driven project, considered one of the main reasons funding was subsequently obtained to start the collaboration.

So in this case, the environmental issue was perceived by the community that led to engagement with scientists and then funding bodies. Community members provided an existing 'network of enthusiasm' able to be engaged to collect the large-scale research data required for scientific analysis.

Some of the lessons learnt over the period of the project so far include:

- Roles of each partner agency must be clearly defined, especially with regards to project ownership, coordination, training and publicity.
- The development and maintenance of a successful smartphone app requires significant resources, including for engaging with app developers to specify requirements and define functionality and ensuring adequate support for the app subsequent to its release.
- Training helps deliver the best from volunteers. In the case of the Marri Canker Project, volunteers were provided training in both project research methods and smart phone technology.

This citizen science project, together with the deployment of The Marri App, has provided ongoing engagement with concerned members of the community in both rural and urban regions. More than just education and outreach, it has allowed large scale data collection that would otherwise be a laborious and costly research impediment. The contributed data for 335 trees across 31 sites is now in the process of being analysed by research scientists to understand the decline process and test potential treatments with the aim of developing sustainable management solutions. This project has already served as a model in setting up a new 100 tree treatment trial currently being undertaken in the Shire of Mundaring, east of Perth, also in conjunction with the Eastern Metropolitan Regional Council.

Acknowledgements

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References

Paap, T., Burgess, T.I., McComb, J.A., Shearer, B.L. and Hardy, G.E.S.J. (2008). *Quambalaria* species, including *Q. coyrecup* sp. nov., implicated in canker and shoot blight diseases causing decline of *Corymbia* species in the southwest of Western Australia. *Mycological Research* 112: 57–69.

Links

The Marri App for Android: v1.0.5, 22 Feb 2015: <https://play.google.com/store/apps/details?id=com.gaiareources.bdrsmobile.murdochmarri>

The Marri App for iOS: v1.0.1, 07 April 2015: <https://itunes.apple.com/au/app/the-marri-app/id742004918>