Mapping and modelling Lantana distribution – effects of environmental gradients and climate change

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Major findings and outcomes of the collaboration:
This travel grant was used to attend a 4-day training workshop for CLIMEX software at CSIRO in Canberra run by Hearne Scientific. CLIMEX software can be used to estimate the potential geographical distribution and seasonal abundance of a species in relation to climate and thus it can be used to make predictions for other, independent locations. The final phase of my PhD research involves modelling the potential distribution of lantana in light of climate change. I will construct a probability map of lantana invasion which will highlight areas that need to be prioritized for control and management of lantana invasion along the eastern coast of Australia based on their high probability of being invaded. I also hope to use CLIMEX to model the potential distribution of two other plant species:

- Elaeocarpus williamsianus (Hairy quandong)
- Zieria bifida (Brolga Park Zieria)

These two species are believed to be under threat from lantana and listed as threatened under state/territory and national legislation. This will enable me to predict the impact of lantana on the potential distribution of these two threatened species in light of climate change. CLIMEX is a highly technical modelling program which requires specialised training. Therefore, the workshop was extremely useful because it provided intensive training in the use of this software. I also spent the last day of the workshop fitting parameters for lantana distribution that has contributed significantly to my research project and resulted in a considerable saving of time. Thus, the 4-day training course has provided me with the expertise to complete the final phase of my study. I also made useful contacts with other people involved in species distribution modelling during the workshop.

Significance to adapting and protecting Australia's terrestrial biodiversity:
Given that lantana is an invasive allelopathic species, it impacts adversely on native biodiversity by competing with native vegetation. Any predictive modelling that can assist in its management has the potential to improve natural biodiversity. The resulting probability map of lantana distribution as well as the potential distribution of the two threatened plant species will allow resource managers to identify areas at risk well in advance and to prioritize management strategies and actions in a timely and cost effective manner.

Future Research Suggestions:
This software is a powerful tool and may also be used to model the potential distribution of other invasive species as well as those they threaten. Invasive species, particularly weeds, have far reaching impacts on biodiversity and agriculture even under the present climatic conditions. It is important to understand how such impacts will change in light of climate change. Some of these species may expand their range and cause more damage in the future. As such, the climate change function in CLIMEX is particularly useful for this purpose.

I would like to take this opportunity to thank NCCARF-TB Network as this travel grant has been very valuable because it provided me with the expertise to complete the final phase of my project and therefore contributes to a timely completion of my PhD. I am also extremely grateful to the network for their flexibility regarding report submission, as Hearne ran the training workshop much later in the year than originally anticipated.

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