DEVELOPING MULTIMETRIC INDICES FOR MONITORING THE PROGRESS OF REHABILITATION

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INTRODUCTION

Rehabilitating riparian areas in the Hunter Catchment, NSW (Fig. 1) involves controlling exotic plants and reintroducing native trees. Initiatives aim to return these areas to a more natural state and provide habitat for native fauna.

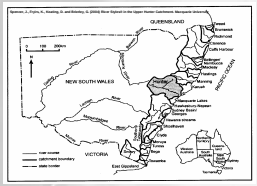

Fig. 1. Location of the Hunter Catchment

Terrestrial invertebrates have been used to monitor the progress of ecological rehabilitation due to their diversity, abundance and importance in ecosystem functioning. However, comprehensive surveys of invertebrates:

- **often take many months to complete**
- **require specialised equipment and taxonomic expertise, and so,**
- **can be expensive**

What is needed are monitoring programs that provide timely and cost-effective information. Programs that are suited to a range of skill levels and backgrounds are also required since rehabilitation is often implemented by community groups.

My research is developing invertebrate monitoring metrics that are:

- **easily measured and interpreted**
- **cost-effective**
- **based on structural aspects of invertebrate assemblages or on ecological processes (e.g. pollination rates)**
- **strongly related to the gradient of successive rehabilitation states**

This poster concerns just one of many metrics under investigation, focusing on the composition and abundance of web-building spiders.

METHODS

Sampling was completed at 24 riverine locations in varying condition (Fig. 2 a,b,c) over 120 km.

Fig. 2. (a) a riparian area dominated by exotic plants (b) young native seedlings that have been reintroduced and (c) a riparian area in a natural state

Webs were located using a water mister and the following characteristics were recorded:

- **general shape**
- **average number & width of sticky spirals**
- **type and shape of ornamentation in the hub**
- **incidence of retreats/eggs sacs (Figs 3a, b).**

To link web type and spider species, the spider from each web was removed and identified to the lowest taxonomic level possible. A matrix of web characteristics was put together and an identification key was constructed (Fig. 4).

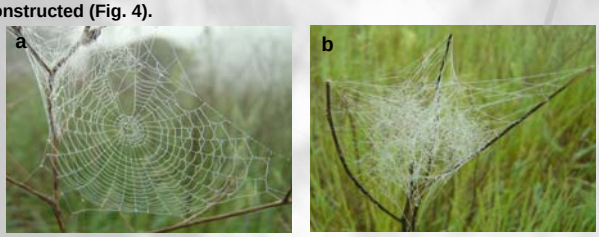

Fig. 3. Examples of two different web types: (a) shows a plain orb with an open flimsy weave, supported by a dead twig without retreat or eggs sacs, and (b) shows a fine tangle web without retreat.

RESULTS

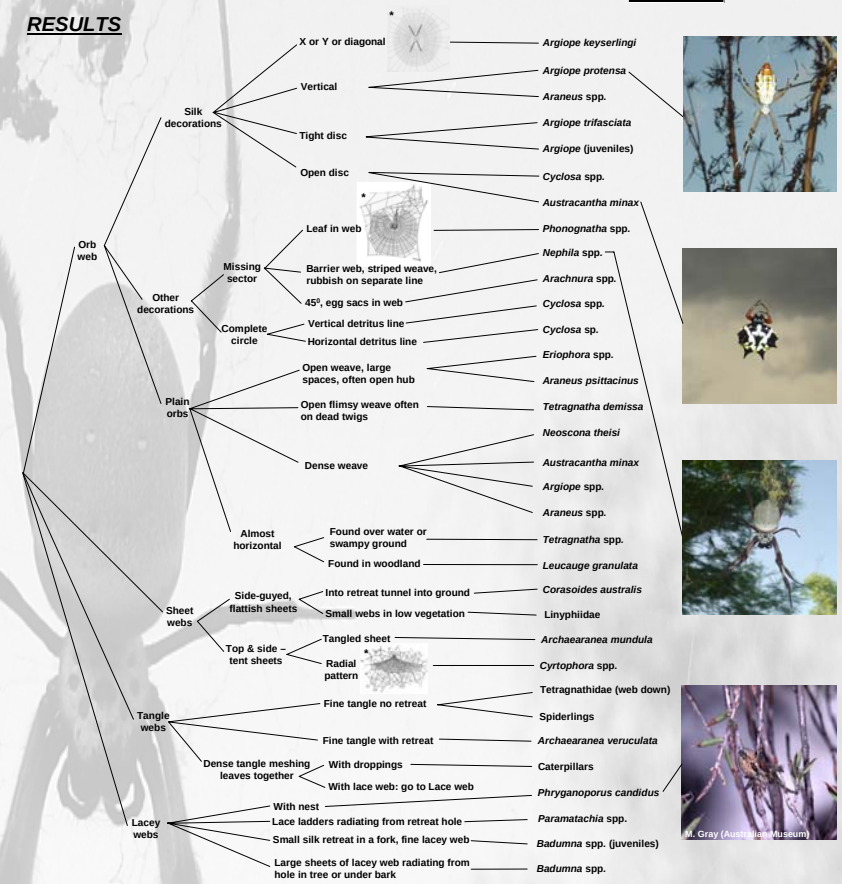

Fig. 4. The *Web-2-Spider Identification Key* (in diagrammatic form) showing the links between web characteristics and spider species. (*Diagrams in Main, B.Y. (1976) Spiders. Collins Sydney)

DISCUSSION

The *Web-2-Spider Identification Key* is under development and will need further refinement as new spider species are discovered. However, the key offers a number of advantages compared to the traditional method of searching for and collecting specimens. For example, the key:

- **can be used by people with a range of skills and backgrounds**
- **eliminates the need for taxonomic help**
- **is non-destructive**
- **is more cost-effective because there isn't a costly laboratory processing stage**

Web indices such as web richness (a surrogate of web-spider species diversity) are showing strong relationships with environmental variables across the rehabilitation gradient (data not shown). A range of other cost effective methods are also being investigated (Figs 5a,b,c).

Fig. 5. A range of simple, cost effective metrics are being investigated e.g. (a) rates of dung decomposition as measured by visual inspection of dung pellets, (b) a burrow diversity metric based on features of burrows and (c) rates of seed removal by ants.

CONCLUSIONS

Because ecological recovery may occur over long time periods, an effective monitoring effort will require a long-term commitment. Simple and cost-effective methods of assessment will ensure that managers have the means to meet this obligation.

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