‘BiGG’ Spider Responses to Paddock Management on Mixed Farms in the Sheep-Wheat Zone

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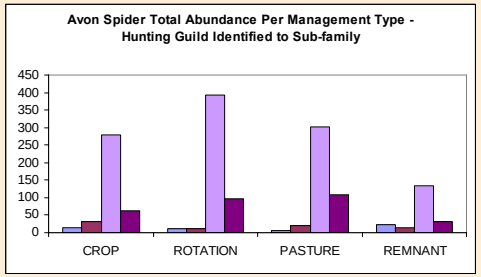
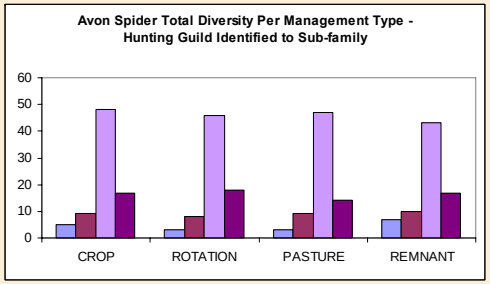
The Biodiversity in Grain & Graze project (BiGG) aims to document the impact of land management on the diversity of species and functional groups of a range of indicators in four different land use types on mixed farms across the sheep-wheat zone. Target groups including beetles, ants and spiders, were collected from pitfall traps (10) in each of 4 paddocks (crop, break –crop ‘rotation’, pasture and remnant vegetation) from 47 farms around Australia. Data were collected in autumn and spring 2006, 2007. This poster presents some of our preliminary findings from the two 2006 samplings.

Nicodamidae

Gnaphosidae

Thomisidae





Analysis of functional groups shows community structure remains similar even when abundance varies between land use types. The high number of ground hunters reflects the pitfall trap sampling method.

- Foliage hunter
- Ground, foliage or bark hunter
- Ground hunter
- Web on ground

Some families are more likely to be seen in one paddock type over another. For example, Web spinners and Foliage hunters

Foliage hunters
(families Clubionidae, Thomisidae, Oxyopidae)

Pollinators and plant-feeding prey such as aphids are common in pasture and standing crops. Oxyopids are active in grass and low vegetation during the daytime. They have been found in all regions except LCW and Corangamite and are more abundant in crops and pasture than remnants. Thomisids rely on camouflage and ambush hunting amongst flowers and foliage. They were more abundant in Avon’s crop and pasture paddocks and in NAR’s remnants.

Ground hunters
(families Lycosidae, Gnathosidae, Zodariidae)

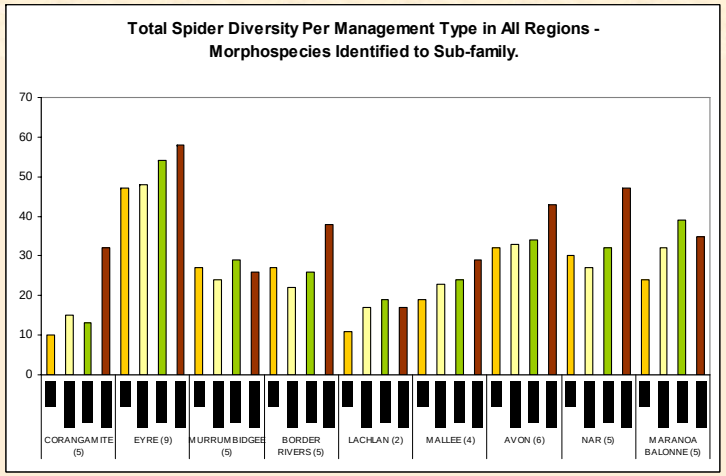
Wolf spiders (Lycosidae) are ubiquitous in farmland, while gnathosids were widespread in both remnants and farmland while zodariids were largely confined to remnants.

Wolf spiders are mostly nocturnal hunters while zodariids are daytime hunters.

Zodariidae: Storeninae

Oxyopidae

Clubionidae



Web spinners
(families Linyphiidae, Oonopidae, Nicodamidae, Dictynidae)

Crop stubble, pasture and remnant provide complex habitat suitable for the micro web builders that create sheet webs amongst the vegetation. Aerial dispersing spiders such as the linyphiids recolonise after tillage or disturbance when juveniles “balloon” on the wind attached to gossamer threads. Linyphiids were absent or had low abundance in remnants.

Dictynidae

Linyphiidae

Spiders from all regions
In Autumn and Spring 2006, 258 spider morphospecies were identified on 47 farms. Increased structural complexity of habitat is usually correlated with increased spider diversity, which was supported by our data. We found that remnant vegetation (the most structurally diverse land use) had the highest diversity in six of the nine regions.
There was a general trend of increased diversity with number of samplings undertaken (n=3), and diversity is still rising. Border Rivers diversity increased dramatically after “good” rain.
Total regional diversity increased with the number of farms within each region (in brackets).
The four most abundant families recorded were Lycosidae, Zodariidae, Linyphiidae and Gnaphosidae. The least abundant families were those usually found in different habitats than the litter layer, the orb-weaving Araneidae, and hunters from mixed habitats, Mimetidae, Amaurobiidae and Cyclotenidae.

Linyphiidae:Erigoninae

Corrinidae

Summary - Spiders may play a useful role on farms as important predators that can control pest species.

- Spider diversity was usually highest in the most structurally complex habitats, in this study, mostly remnants.
- Repeat samples increase diversity measures by capturing the less abundant or cryptic animals, and those reliant on certain climatic conditions.
- In fragmented landscapes dispersal mechanisms can greatly influence spider numbers. Long-lived sedentary mygalomorphs were found in remnants. Aerially mobile linyphiids were most abundant in rotation and pasture paddocks and least abundant in remnants where niches may already be occupied. Nomadic ground hunters such as gnaphosids and lycosids were widespread in the minimum or no tillage Avon farms.
- It must be reinforced that this is only a preliminary analysis of some of the data. At this stage, it appears that minimum or no tillage is one method that farmers can use to maximise vegetation structural complexity and spider diversity.

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