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RETURNING THE FORGOTTEN ANIMALS - BUGS

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OFTEN invertebrates (insects, spiders, scorpions) are seen as pests whenever they cross our path. However, only very few species of invertebrates are pests. When revegetating or rehabilitating land, it is important for many invertebrates to return so that they may begin vital ecological processes such as pollination (butterflies, bees, beetles, flies), decomposition (termites, beetles), soil aeration (worms, ants), recycling through herbivory (caterpillars, bugs, beetles) etc. Furthermore, invertebrates provide essential food for larger animals, such as birds, reptiles and mammals. Without the invertebrates, these larger animals can not survive.

On an interesting *Land for Wildlife* Day at Coorow, the participants were able to spend an afternoon investigating the fauna of three different patches of land. The first patch was a bushland remnant, the second revegetated farmland and the third was a salt affected corridor. Armed with large beating sticks we set forth to dislodge any 'true' bugs from the plants. True bugs are of the order Hemiptera, or sucking bugs. Some look similar to beetles. However, unlike beetles, bugs have sucking tube-like mouthparts and relatively soft wings. They include herbivores such as aphids, cicadas, stinkbugs and leafhoppers, and predatory animals such as assassin bugs and bed bugs - fortunately we don't have the latter in Western Australia.

A quick survey of the three sites demonstrated the differences between their bug fauna. Only one species captured was an introduced pest; the Pea Aphid (*Acyrthosiphon pisum*) (Figure 1). This aphid was present in plague proportions on crops in the area and had travelled into the bushland remnant. All the other species captured were very interesting native species. Of the 12 native species, 9 were undescribed (species without a name) (Table 1). To determine this, the animal must be killed (a humane method is freezing) and then mounted on a pin with labels detailing collection information such as the locality, date and collector. The genitalia of male specimens must be dissected and compared with described species. Sometimes this is very difficult as described specimens may be housed in institutions either interstate or overseas. Many Hemiptera (as well as other invertebrates) in WA are new to science and without names. This is particularly disturbing as we don't know if many species are threatened or have already gone extinct. And as this survey at Coorow demonstrated, even animals we find in our own backyards can be undescribed!

Figure 1: Aphid Acyrthosiphon pisum *in the wingless form (3-5mm in length)*

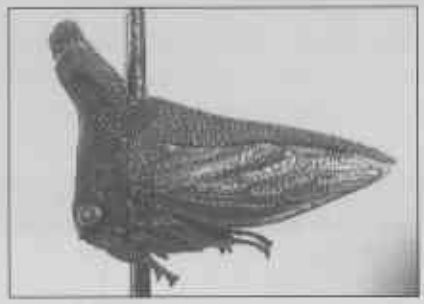

Figure 2: The horned treehopper Eufrenchia falcate *(9-11mm in length)*

Figure 3: The stinkbug Deroploopsis bidentatus *(10mm in length)*

Figure 4: The plantlice Psyllidae sp.1 (5mm in length)

The most species (8) and the largest number of animals (25) were captured in the bushland remnant. This was expected as more structurally complex and diverse habitats, such as those with many plant species including trees, shrubs and groundcovers, are generally thought to contain more bugs. A surprising result occurred with the revegetated farmland, which only had 4 bug species. In contrast, the salt affected corridor had 5 species. This can be explained by examining the species – those of the salt affected corridor were usually not found elsewhere. This suggests that these bug species were host specific to the plants in the salt affected areas. The plant species were not found in the other areas, and therefore, neither were the bugs. Many bugs will follow particular plants. For example, the horned treehopper (*Eufrenchia falcate*) collected in the bushland remnant was feeding specifically on an *Acacia* species (Figure 2). This *Acacia* species was not found at the other sites, therefore, neither was the horned treehopper. In contrast, some bugs can feed from many different plants. Psyllidae sp. 1 may have been just such a species as it was the only bug present at all sites.

Another interesting bug was the horned stinkbug *Deroploopsis bidentatus*, the patterning on which resembled aboriginal artwork (Figure 3). There are 5 species of this genus and often the males and

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Figure 5: The female leafhopper Tartessoides griseus *(8-10mm in length)*

Figure 6: Macropsinae sp. 2 leafhopper (3-4mm in length)

Figure 7: Ricanildae planthoppers looks very similar to moths (10mm in length)

Table 1: Hemipteran species collected in three sites at Coorow

Family	Species	Common name	Bushland Remnant	Revegetated farmland	Salt affected corridor
Psyllidae	sp. 1	Plant lice	15	6	1
Membracidae	*Eufrenchia falcata*	Horned treehopper	4		
Ricaniidae	sp. 1	Plant hopper	1		
Cicadellidae	Macropsis sp. 1	Leafhopper	1		
Cicadellidae	Macropsis sp. 2	Leafhopper		2	
Cicadellidae	Macropsinae nymph	Leafhopper	1	7	
Cicadellidae	*Tartessoides griseus* nymph	Leafhopper			2
Lygaeidae	sp. 1	Seed bug	1		
Lygaeidae	sp. 2	Seed bug			1
Aphididae	*Acyrthosiphon pisum*	Pea Aphid	1		
Achilidae	sp. 1	Plant hopper		2	
Miridae	sp. 1	Plant bug			1
Pentatomidae	*Deroploopsis bidentatus*	Horned stink bug	1		
Pentatomidae	nymph	Stink bug			2
Pentatomidae	sp. 1	Stink bug	1		
Total			26	17	7

females have differently shaped horns from one another. However, they are relatively rare, so the record is an interesting one. The Achilidae (planthopper) was also interesting, as many of these are restricted to large forests of higher rainfall zones, such as the jarrah forest of the southwest. The juveniles of this bug family feed on fungus, therefore rotting wood and other likely habitats are required for these bugs to appear.

One afternoon of bug collecting at these three sites just scratched the surface of the biodiversity present. Undoubtedly, if we had sampled all the different plant species in each site, we would have collected many more bug species. In addition, using different methods of collecting such as pitfall traps (cups/containers in the ground) or vacuum sampling (inverting a weed-blower and sucking the invertebrates from plants) would have produced many more species. The types of bugs present will change depending on the time of year, therefore most invertebrate surveys that wish to determine the biodiversity at a site will collect in that area at least once a season.

So what can be done to increase the biodiversity of bugs and other invertebrates in a remnant? Providing many different habitats (including logs, large rocks, leaf litter, large trees and groundcovers) and as many different native plant species as possible will maximise the number of invertebrate species in revegetated land. And if increasing the number of weird and wonderful creepy crawlies isn't enough, the diversity of invertebrates will provide a flow-on effect, in that birds and other larger animals will follow into the remnant.

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