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**THE MYGALOMORPH SPIDERS FROM THE MT  
GIBSON REGION, WESTERN AUSTRALIA, INCLUDING  
SPECIES APPARENTLY ENDEMIC TO THE AREA**

**Report to ATA Environmental  
October 2005**

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# REPORT TO ATA ENVIRONMENTAL ON MT GIBSON MYGALOMORPH SPIDERS

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## OBJECTIVES

**To identify the mygalomorph spiders (trapdoor spiders) collected by ATA Environmental during a survey of selected invertebrates targeting short range endemic species at the site of the proposed Mt Gibson iron ore mine.**

## INTRODUCTION

The trapdoor and funnelweb spiders (Mygalomorphae) are richly represented in Australia with ten families. Of these, eight occur in Western Australia with seven represented in the Wheatbelt. The remaining family, Migidae, is confined to the moist forested and topographically high areas of the southwest of the state. Of those occurring in the wheatbelt, the “brushfooted” Theraphosidae (so-called bird eating spiders) which are generally tropical and secondarily inhabit arid areas (Main 1997), impinge on the northern and eastern margins only. The remaining six families are well represented throughout the wheatbelt and lower pastoral areas. The Idiopidae (typical trapdoor spiders) and the Nemesiidae (mostly open-holed burrowers) are particularly diverse both taxonomically and ecologically and comprise many genera, some of which eg. *Aganippe* (Idiopidae) and *Teyl* (Nemesiidae) have undergone sequential radiations in response to geohistorical events combined with climatic change (Main 1996, 1999) resulting in a plethora of species. Both these genera include some species with highly restricted geographic distributions and others with extensive ranges.

All the families occurring in the Wheatbelt except the Theraphosidae were collected during the present Mt Gibson survey by ATA. However the Theraphosidae are assumed to occur in the area as representatives are known from the surrounding region (personal observations and collections). The other family of brush footed trapdoor spiders, the Barychelidae, is excluded from the present analysis although specimens were collected.

## METHODS

**Field collecting** was restricted to pitfall trap sampling conducted by ATA at 20 sites comprising sites in both areas of prospective disturbance and sites outside potential areas of disturbance (see plan of survey design attached).

Ten pit traps were inserted at each respective site. Pitfall traps of two-litre ice-cream containers, were set into the ground with the tops flush with soil surface. Approximately 500 ml of ethylene glycol was poured into each container which remained in situ through April and May until 11th June. These were cleared every two weeks. Collected specimens were transferred to 75% ethynol, labelled and transported to the Western Australian Museum for sorting and subsequent identification.

**Specific identity** of mygalomorphs depends generally on the morphology of the reproductive structures of adult specimens -- male palp morphology and spination of tibia I, and the internal genitalia (configuration of the spermathecae) of females. Nevertheless in some genera (of relevance here *Conothele*, *Missulena* and *Cethegus*) the male external organs are remarkably conservative, especially the male palpal structures and hence other morphological features are of more significance for specific identity. In addition, particularly in the males, many secondary sex structures associated with leg spination as well as other morphological features such as colour and size, and configuration of the eyes, are useful. Females are usually very conservative in their external morphology but burrow configurations and trapdoor structures are frequently specifically distinct.

Females are sedentary and remain in a single burrow throughout life, foraging within reach of the burrow. Adult males abandon their burrows when ready to mate and wander varying distances when searching for female burrows where mating takes place. It is during this "running" or wandering phase that males can be readily captured in pitfalls and this technique is standard for sampling the array of mygalomorph species in biological surveys. While many dispersing juveniles are also captured specific identity is rarely apparent and even generic identification is not always possible.

Specimens from this survey were identified to family, then genus and named species when possible. Unnamed entities were then assigned a species number (for Mt Gibson). These "species" were then identified further against the working Tables of species identified from the Carnarvon Basin Biological Survey (Main et al 2000) and the Wheatbelt Survey for the Salinity Action Plan (Main unpublished). In addition in some instances the resources of my collection (housed in the Zoology Building at the School of Animal Biology, University of Western Australia) and the spider collection at the Western Australian Museum were consulted in an attempt to show which species occur also outside the Mt Gibson survey area.

## RESULTS and CONCLUSIONS

Six families of mygalomorphs were identified from 180 specimens (59 adult males, five females and 116 juveniles). The Barychelidae were excluded from the analysis and identification of genera and species was thus limited to the five families: Actinopodidae, Ctenizidae, Dipluridae, Idiopidae and Nemesiidae. Ten genera and 17 species were recognised as listed in Table 1. Identification was restricted to adult male specimens except where identifiable genera and/or species were represented only by juveniles or females from particular sites.

### Comments on selected species in relation to sites and possible distribution elsewhere (see Table 1)

Of the 20 sites sampled, **10** species were collected from six of the eight sites to be potentially disturbed.

**Six** (of these 10) species were collected **only** from sites to be potentially disturbed: *Missulena* sp. 2 ( sites 13, 15, 18); *Aganippe* sp. 1 (site 13); *Eucyrtops* sp. 3 (site 13); *Eucyrtops riparia* (site 17); *Gaius villosus* ? (site 17); *Kwonkan* sp. indeterminate (site 1).

However of these six species **three** (*Missulena* sp. 2, *Eucyrtops riparia* and the *Gaius* sp. (tentative identification *G. villosus* ) also occur outside the proposed Mt Gibson mine area.

Although it is not known unequivocally whether *Missulena* sp. 3, *Conothele* sp. 1, *Aname* spp. 1 and 2, and *Teyl* sp. 1 occur outside the Mt Gibson mine area they have been collected only from sites not to be disturbed.

Furthermore *Missulena* sp. 3 is similar to *Missulena* sp.7 from the Wheatbelt survey, *Conothele* sp. 1 is similar to *Conothele* sp. 1 from the Carnarvon Basin Survey and the conspecific *Conothele* sp. 1 from the Wheatbelt survey; the *Teyl* sp. 1 also is similar to certain *Teyl* specimens found in neighbouring areas.

**Thus, in conclusion on the present scanty data, the three species *Aganippe* sp 1, *Eucyrtops* sp. 3, and the unidentified *Kwonkan* species which possibly do not occur outside the Mt Gibson mine area are of potential conservation concern.**

### **Comments on species of possible conservation concern**

Two male specimens of *Aganippe* **sp. 1** were collected from site 13. Although similar morphologically to *A. castellum* Main (the Tree stem trapdoor spider) there are some slight differences thus the status of this species remains equivocal. *A. castellum* is distributed in a narrow north/south band through the central wheatbelt but its range is now fragmented due to agricultural clearing. Because the burrow is so conspicuous (it extends as a tube up the stem of a shrub or tree and has a fan of twig lines hanging down from the rim of the tube) - it would be surprising if burrows had not been observed during the survey.

*Eucyrtops* **sp. 3** is represented by a single damaged specimen - the first pair of legs (on which are borne some of the diagnostic characters) is missing. The palp structures, eye arrangement and the small body dimensions resemble those features of *E. eremaea* Main which occurs near Laverton (and possibly elsewhere). However without a complete specimen the species identity is equivocal and hence the assumed endemism is doubtful.

A single juvenile specimen of *Kwonkan* was collected. As a juvenile there are no specific diagnostic features present. *Kwonkan* is widely distributed throughout the state but only six species have been named (Main 1983) of what appears to be a speciose genus. Without adult specimens it is not possible to comment on the specific status of the juvenile specimen collected from the Mt Gibson site.

## References

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- Main, B. Y., Sampey, A. and West, P. L. J. 2000. Mygalomorph spiders of the southern Carnarvon Basin, Western Australia. *Records of the Western Australian Museum. Supplement No. 61*: 281-293.

**TABLE 1.**

List of 17 species of mygalomorph spiders and sites where present in the ATA Environmental Mt Gibson survey area (sites in prospective areas of disturbance in bold face). Species known to occur elsewhere with asterisk; dubious location elsewhere due to taxonomic uncertainty with (?); possible endemics to Mt Gibson area indicated by (E ?).

Records are of adult males unless indicated as juveniles or females which are only listed if from sites where no males have been recorded. [See Survey Design Table for location and characteristics of sites].

**ACTINOPODIDAE**

<i>Missulena</i> sp. 1 *	2, 10
<i>Missulena</i> sp. 2 *	<b>13, 15, 18</b>
<i>Missulena</i> sp. 3 (?)	5, 6

**CTENIZIDAE**

<i>Conothele</i> sp. 1 (?)	16
juveniles	3

**DIPLURIDAE**

<i>Cethegus</i> sp.1 *	5, 10, <b>18</b> , 20
juveniles	4, <b>13</b>
female	6

**IDIOPDAE**

<i>Aganippe</i> sp. 1 (?)	<b>13</b>
<i>Arbanitis hoggi</i> (Simon) ? *	6, 10
<i>Eucyrtops</i> sp. 1 *	<b>1,13</b> , 16
<i>Eucyrtops</i> sp. 2 *	<b>2</b> , 10, 19
<i>Eucyrtops</i> sp. 3 (E ?)	<b>13</b>
<i>Eucyrtops riparia</i> Main *	<b>17</b>
<i>Gaius</i> sp.	
juvenile probably <i>G. villosus</i> Rainbow *	<b>17</b>

**NEMESIIDAE**

<i>Aname</i> sp. 1 (?)	16, 20
<i>Aname</i> sp. 2 (?)	19
<i>Kwonkan</i>	
juvenile sp. indeterminate	<b>1</b>
<i>Teyl</i> sp. 1 (?)	14
<i>Teyl</i> sp.	
juvenile ? female probably <i>T. luculentus</i> *	14

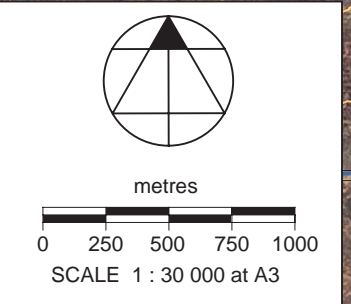
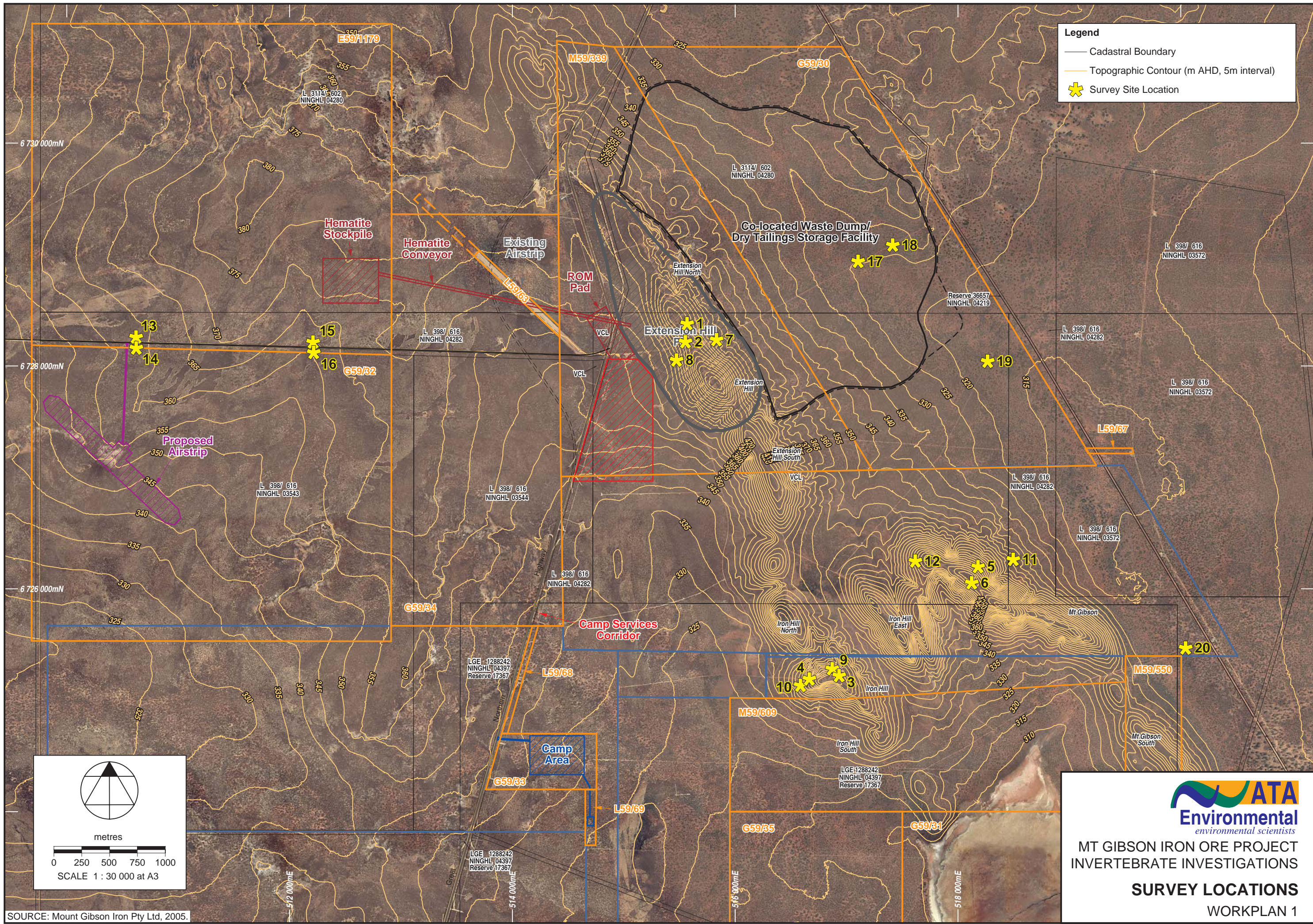
**TABLE 2.****Survey Design**

			Within area to be disturbed	Outside are to be disturbed	Coordinates (MGA)	
1	Banded Ironstone Range	Extension Hill east facing	10 traps		50515569	6728377
2		Extension Hill west facing	10 traps		50515554	6728214
3	Banded Ironstone Range	Iron Hill east facing		10 traps	50516934	6725218
4		Iron Hill west facing		10 traps	50516666	6725188
5	Banded Ironstone Range	Mount Gibson east facing		10 traps	50518181	6726196
6		Mount Gibson west facing		10 traps	50518124	6726051
7	Ironstone Slopes	Extension Hill east facing	10 traps		50515833	6728233
8		Extension Hill west facing	10 traps		50515474	6728050
9	Ironstone Slopes	Iron Hill east facing		10 traps	50516872	6725280
10		Iron Hill west facing		10 traps	50516587	6725131
11	Ironstone Slopes	Mount Gibson east facing		10 traps	50518497	6726261
12		Mount Gibson west facing		10 traps	50517618	6726246
13	Sandplains 1 (A)			10 traps	50510622	6728207 south side of road
14	Sandplains 2 (B)			10 traps	50510622	6728207 north side of road
15	Sandplains 3 (C)			10 traps	50512211	6728162 south side of road
16	Sandplains 4 (D)			10 traps	50512211	6728162 north side of road
17	Woodlands 1 (A) impact		10 traps		50517104	6728936
18	Woodlands 2 (B) control		10 traps		50517415	6729082
19	Woodlands 3 (C) impact			10 traps	50518267	6728039
20	Woodlands 4 (D) control			10 traps	50520044	6725466



**Legend**

- Cadastral Boundary
- Topographic Contour (m AHD, 5m interval)
- ★ Survey Site Location



**ATA Environmental**  
*environmental scientists*

**MT GIBSON IRON ORE PROJECT  
 INVERTEBRATE INVESTIGATIONS**

**SURVEY LOCATIONS  
 WORKPLAN 1**