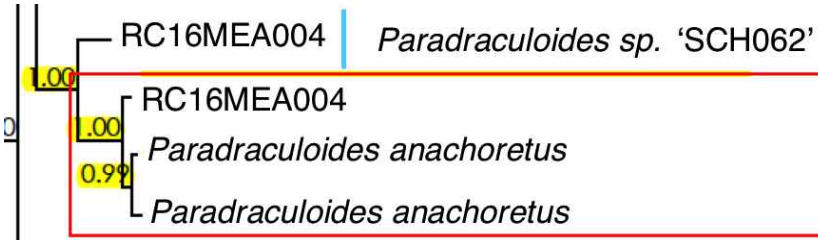
Biota Environmental Sciences

Mesas A and K Targeted Troglofauna Survey



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Mesa A and K Targeted Troglofauna Survey

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1.0 Project Summary

In accordance with the Rio Tinto scope of work, Table 1.1 presents a summary of survey and project information.

Table 1.1: Summary of project specifications and limitations.

Project Name	Mesas A and K Targeted Troglofauna Survey			
Level of Survey	Targeted survey			
Location	Approximately 38 km west of Pannawonica township			
Survey Area Size	Mesa A	20 km^2	Mesa K	6.3 km^2
Survey Timing	Surveys completed between December 2016 – March 2017			
Relevant Regulatory Guidance Documents and Applicable Legislation	• EPA Statement of Environmental Principles, Factors and Objectives (EPA 2016a); • Environmental Factor Guideline – Subterranean Fauna (EPA 2016b); • Technical Guidance - Subterranean fauna survey (EPA 2016c); and • Technical Guidance - Sampling methods for subterranean fauna (EPA 2016d).			
Key Survey Limitations	• Sampling for troglofauna in the Robe Valley and wider Pilbara region relies on the use of drill holes, which are almost always installed as part of exploration drilling and thus focus on geological units of economical importance. This creates a bias in availability of drill holes for troglofauna sampling, as sampling tends to not extend far beyond the footprint of the target ore body and is focussed on particular rock types. This places limitations on determining wider species distributions and whether there are potential barriers to dispersal. • For most taxa, only adult specimens have diagnostic morphological characteristics necessary to be identified to species level. As juvenile specimens are often collected, this limited the level to which many specimens could be identified. These specimens, as well as those too damaged to identify have been classified as indeterminate species (sp. 'indet'). Indeterminate species (e.g. *Paradraculoides* sp. 'indet' and Thysanura sp. 'indet'), while reported on for transparency within the results, were removed from the discussion analysis since these specimens may represent multiple species or may equate to a species already known elsewhere. • A relatively small number of sampling locations were available to investigate the subterranean fauna habitat questions considered by this study (only a single site in the case of the low grade waste dump at Mesa A). With the high degree of ecological sampling effects and intra-site variation inherent in troglofauna data sets, this limits the power of the sampling design and thereby the conclusiveness with which this study can resolve habitat utilisation.			

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2.0 Executive Summary

Rio Tinto wishes to improve knowledge on the persistence of troglobitic communities within historically disturbed habitats at Mesa A and Mesa K. The target habitats in this respect include substrate beneath existing mine pits and habitat beneath or within waste dumps.

Biota Environmental Sciences (Biota) was commissioned to undertake targeted troglofauna sampling at Mesa A and K to build upon data from previous surveys in each area and investigate whether troglofauna communities still persist beneath the pit floors, the extent of these communities, and whether they have become established within, or still persist beneath, waste dumps.

Two phases of troglofauna sampling involving three field mobilisations were conducted at Mesa A and K between December 2016 and March 2017. A total of 19 drill holes were successfully sampled within the Mesa A and Mesa K survey areas (14 and 5 sites respectively). Fifteen sites were sampled in consecutive phases and four sites sampled once. A total of 86 troglofauna traps were installed with 79 traps recovered. The number of traps installed per site varied from 1 – 3 traps depending on hole depth. Haul net scraping was completed for 16 of the 19 sites during Phase 1. No haul net scraping was conducted during Phase 2.

A total of 383 specimens, representing 44 taxa across 11 orders were documented for the Mesa A search area during the desktop review. Of these, 22 taxa could not be identified to species level. Six of the remaining 22 taxa represent formally described species and the remaining 16 taxa are undescribed. The most commonly collected species was the schizomid *Paradraculoides anachoretus*, representing over 32% of specimens. This species, as well as four pseudoscorpion species, *Lagynochthonius asema*, *Tyrannochthonius* sp. 'Mesa A', *Ideoblothrus linnaei* and *Ideoblothrus* sp. 'Mesa A', are all listed as conservation significant.

The Mesa K desktop review yielded 363 past specimen records representing 29 taxa across 14 orders. Seven taxa were unable to be identified to species level and four taxa aligned with formally described species. The remaining 18 taxa are currently undescribed. The schizomid species *Paradraculoides kryptus* was most commonly recorded, representing over 38% of Mesa K collections. This species is the only listed conservation significant fauna species identified from the desktop review for Mesa K.

During the current survey, four schizomid specimens were recorded from drillhole RC16MEA004 at Mesa A, all of which were recorded during Phase 2. Genetic analysis of the collected Schizomida determined the presence of two distinct lineages, equating to two species for the purpose of this report, *Paradraculoides anachoretus* and *Paradraculoides* sp. 'SCH034'.

Paradraculoides anachoretus has been widely recorded from Mesa A in the past and is considered to be endemic to the mesa. *Paradraculoides* sp. 'SCH034' was recorded from RC16MEA004 during the current sampling, which is located within the pit and drilled through a low-grade waste dump, and has previously been recorded from two sites within the Mesa A Mining Exclusion Zone (MEZ).

No troglomorphic specimens were collected from Mesa K during the current survey, and no additional information on habitat utilisation by troglofauna at this site is therefore available.

Currently, insufficient data exist to allow for a robust analysis comparing results of sampling in-pit at Mesa A with the results of sampling within the MEZ and prior to mining operations, but both schizomid species recorded in-pit have been demonstrated to also occur within the MEZ. Most sampling effort since operations commenced has focused on reference area sampling. However some observations can still be made from the results of the in-pit sampling. From the very limited data available, it is possible troglofauna may be utilising the low-grade waste dump at Mesa A as habitat. However, information provided by Rio Tinto indicates that the sampled drill hole

(RC16MEA004) was also drilled beyond the base of the waste dump and into intact troglofauna habitat below. This introduces the possibility that the troglobites recorded from this site may have entered the drillhole from intact habitat at depth, rather than truly utilising the waste dump as habitat.

3.0 Introduction

Rio Tinto wishes to improve knowledge on the persistence of troglobitic communities within historically disturbed habitats at Mesa A and Mesa K (Figure 3.1). The target habitats in this respect include substrate beneath existing mine pits and habitat beneath or within waste dumps.

Previous studies in the vicinity of Mesa A and elsewhere in the Robe Valley have documented troglofauna species that are isolated to individual mesas, demonstrating extreme short-range endemism, which has implications for environmental impact assessment (EIA). Biota Environmental Sciences (Biota) was commissioned to undertake troglofauna sampling at Mesa A and K, as part of prefeasibility studies to further inform EIA. The purpose of this work is to build upon previous surveys in each study area and investigate whether troglofauna communities still persist beneath the pit floors and waste dumps, the nature and extent of these communities, and whether they have also become established within waste dumps.

3.1 Project Background

Biota conducted sampling for stygobitic fauna at Mesa A in 2003 and recorded four troglobitic taxa within the voids in the pisolitic mesa (Biota 2004). Prior to this, troglofauna had not been recorded from the Pilbara region (Biota 2004). Since this discovery, further sampling has demonstrated that troglofauna are widely distributed within the Robe Valley (Biota 2006a, 2007, 2011a, 2017) and elsewhere in the Pilbara (Biota 2016). However, previous sampling within the Robe Valley mesas has demonstrated that each mesa provides habitat for a unique assemblage of troglofauna (Biota 2006a, 2007, 2011a, 2017). A total of 10 phases of sampling has been completed at Mesa A and 12 phases at Mesa K.

3.2 Objectives and Scope

The scope of this study was two-fold:

- to undertake troglofauna sampling at Mesas A and K to build upon the knowledge gathered during previous surveys in the Robe Valley area; and
- to investigate whether a troglofauna community is present within previously disturbed parts of Mesa A and K.

The key objectives of this study were to:

1. conduct a two-phase targeted troglofauna survey at Mesas A and K;
2. document the recorded fauna to the lowest level of identification possible, including alignment and comparison with previously collected taxa;
3. complete molecular analysis of troglobitic specimens that are not able to be adequately identified morphologically;
4. discuss the distribution of taxa recorded during this survey;
5. discuss the conservation significance of the species recorded during the survey in both a local and regional context; and
6. compare the troglofauna community recorded during this targeted survey with the communities recorded previously at Mesas A and K, and elsewhere in the Robe Valley.

The study was planned and implemented as close as practicable in accordance with:

- EPA Statement of Environmental Principles, Factors and Objectives (EPA 2016a);
- Environmental Factor Guideline – Subterranean Fauna (EPA 2016b);
- Technical Guidance - Subterranean fauna survey (EPA 2016c); and
- Technical Guidance - Sampling methods for subterranean fauna (EPA 2016d).

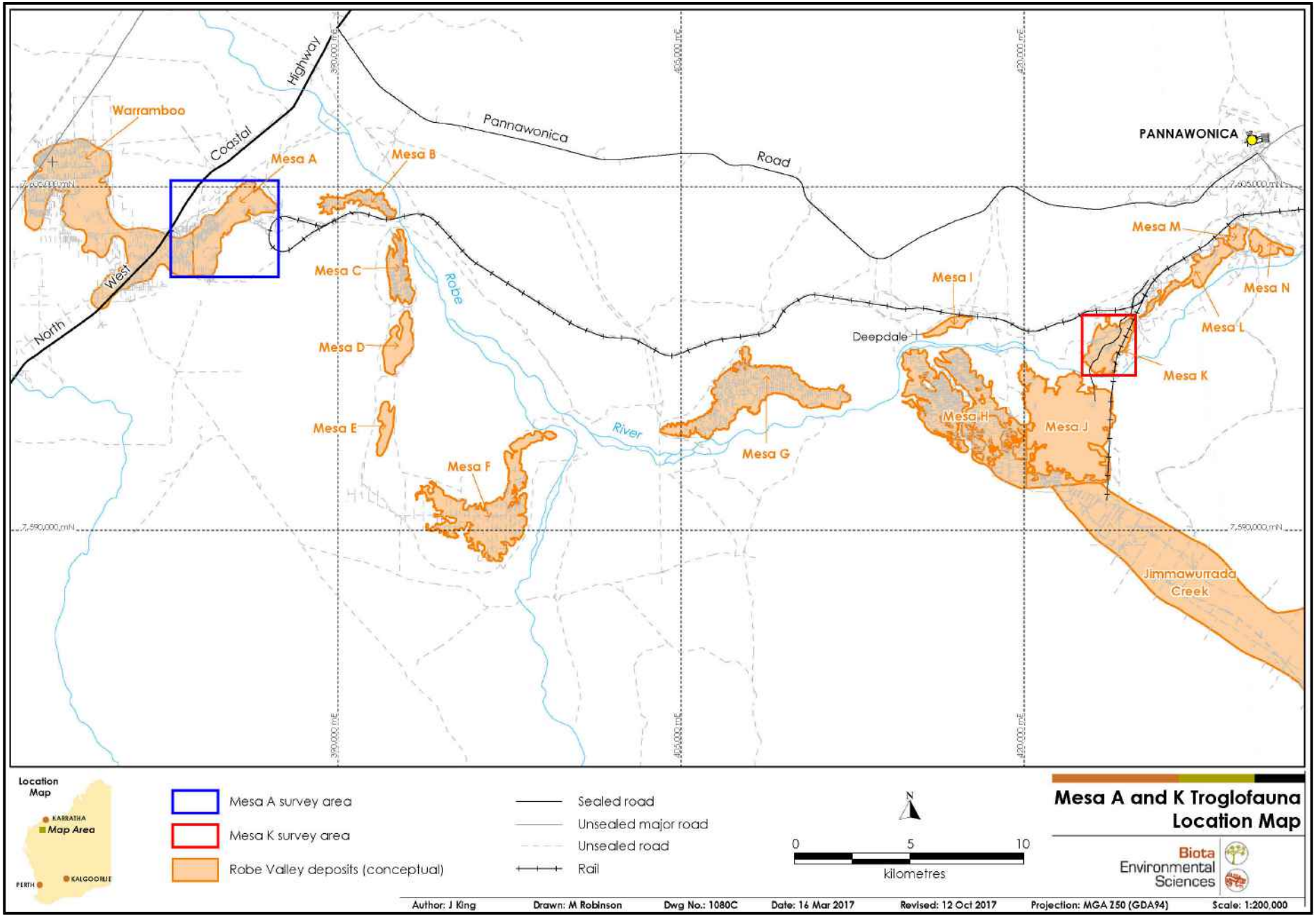

Figure 3.1: Location of the Mesa A and Mesa K survey areas.

3.3 Terminology

For the purpose of this report, the following terms are used as defined below:

Survey area – Refers to the extents of Mesa A and Mesa K that were surveyed as part of the current scope (Figure 3.1).

MEZ – Mining Exclusion Zone; Refers to the avoidance areas set aside at Mesa A where mining is prohibited under current Ministerial approval.

Survey – Refers to the two phases of sampling undertaken for the current scope of work.

3.4 Subterranean Fauna Overview

Until relatively recently, Australia was thought to lack habitat suitable for subterranean fauna. However, recent research (mostly with an emphasis on impact assessment) has revealed Australia to be highly diverse in subterranean fauna, with numerous areas of interest throughout the continent (Guzik et al. 2010). In Western Australia these zones of subterranean biodiversity can be found at Cape Range, Barrow Island, the Pilbara bioregion, the Yilgarn and the Nullarbor (Humphreys 2001, Page et al. 2008, Guzik et al. 2010).

Relatively recent surveys in the Pilbara have collected subterranean fauna from a range of geological units such as pisolitic iron formations, channel iron deposits, unconsolidated alluvium and sedimentary basalt (Marmonier et al. 1993, Biota 2004, 2006a, 2010, 2011b, 2013). This indicates that the suitability of a formation as habitat for subterranean fauna is mostly a function of the availability of habitable space (Marmonier et al. 1993, Humphreys 1999, Biota 2006a), rather than a specific geology unit.

Subterranean fauna habitats are characterised by shared physical parameters that include a lack of light, stable temperature, limited nutrient infiltration from surface environments and a constant humidity (Juberthie 2000, Romero 2009). These habitat characteristics have resulted in convergence in body morphology evolution amongst many subterranean fauna. Morphological characteristics common to most subterranean fauna include reduced or lack of pigmentation, reduced or lack of eyes, and elongate body morphology and appendages adapted for sensory movement (Culver and Pipan 2009, Romero 2009).

Subterranean fauna can be categorised into two distinct ecological groups based on habitat: troglofauna and stygofauna. Troglofauna are a suite of fauna that survive only in air-filled cavities and interstices between the surface and the water table. Stygofauna comprise aquatic taxa occurring in groundwater aquifers and subterranean water bodies. Troglobites and stygobites are obligatory subterranean habitat dwellers, and while they may occur close to surface environments, are strongly adapted to subterranean environments. This makes such fauna unable or highly unlikely to survive surface conditions. A range of similarly adapted fauna known as troglophiles, trogloxenes and edaphobites also occur; these fauna use subterranean habitats opportunistically but are able to survive outside these stable environments. Studies from the Pilbara bioregion have demonstrated that these suites of fauna are not similarly restricted in range and are therefore unlikely to be impacted by small-scale developments (Biota and Helix 2012, Helix 2012).

Troglofauna in semi-arid Australia are thought to be relictual rainforest fauna; fauna adapted to humid environments, which retreated underground to cave systems during the aridification of Australia (In the late Miocene; Humphreys 1993). This is inferred from affinities of the taxonomic groups represented amongst the troglofauna with other extant taxa in tropical climates. Some invertebrate groups with troglobitic representatives include the Arachnida (e.g. Schizomida, Pseudoscorpiones and Araneae), Chilopoda (e.g. Scolopendrida), Diplopoda (e.g. Polydesmida and Haplodesmida), and Insecta (e.g. Diplura, Thysanura, Coleoptera and Blattodea). A single troglobitic vertebrate species of blind snake (*Anilios longissimus*) is known from Australia, collected from Barrow Island (Aplin 1998, Humphreys et al. 2013).

Due to their dependence on constant humidity, the dispersal and distribution of troglobitic fauna species tends to remain limited to individual blocks of inter-connected habitat, leading to long periods of population isolation and speciation. As a result, troglobitic fauna are considered to be of conservation significance, given that species often display extreme short-range endemism and may therefore be affected by relatively small-scale developments such as mining and construction.

4.0 Methodology

4.1 Desktop Review and Database Searches

4.1.1 Review of Previous Relevant Studies

A literature review was completed to identify previous relevant surveys conducted within the survey area. This included searches of Biota's library database, GoogleScholar[1] and the EPA's website, in addition to the identification of previous surveys via database specimen records (Section 4.1.2). Reports and data supplied by Rio Tinto were also collated with the results of the literature search and reviewed.

4.1.2 Database Searches

The following databases were searched to assist with compilation of a list of potential species for the survey area:

1. **NatureMap**: a collaboration between the Department of Parks and Wildlife and the Western Australian Museum (WAM). This database represents the most comprehensive source of information on the distribution of Western Australia's fauna, comprising records from the Fauna Survey Returns database and WA Threatened Fauna Database (both maintained by the Department of Parks and Wildlife) and the WAM Specimen Database.
2. **WAM's Arachnid, Myriapod and Crustacea database**.
3. **Biota Internal Database**: This database includes all of the subterranean fauna data collected by Biota within Western Australia, which includes the majority of the historical records recorded from the Robe River valley.

Details of database searches conducted are summarised in Table 4.1.

Table 4.1: Summary and location of database searches completed

Database	Date	Search Target	Bounding Coordinates	
			Eastings (m E)	Northings (m N)
Biota, NatureMap	17/03/2017	Mesa A	384970	7603500
		Mesa K	423685	7598092
WAM	14/03/2017	Arachnida, Myriapoda and Crustacea	405138	7607948
			435642	7582695

4.2 Sampling Methodology

Troglobitic fauna sampling was completed under "Licence to Take Fauna for Scientific Purposes" No. 08-000238-1 issued to Penny Brooshooft (Appendix 1). Methodology and approach were consistent with those outlined in Technical Guidance; Subterranean Fauna Survey (EPA 2016c) and Technical Guidance; Sampling Methods for Subterranean Fauna (EPA 2016d). Similar methodologies have been used in previous Robe Valley subterranean fauna assessments (Biota 2006a, 2009a, 2011a). Troglobitic fauna were sampled using two methods; baited colonisation traps and drillhole scraping.

4.2.1 Colonisation Trapping

Custom-built litter colonisation traps were suspended at intervals within drillholes located within the study area. Traps were constructed from 60 mm internal diameter PVC irrigation pipe cut to a length of 180 mm. Each trap had a series of 20 mm holes drilled into the side, and traps remained open at the upper end. Up to three traps were installed such that they were in contact with the interior of the sampled drillhole, facilitating fauna entry into the trap.

[1] https://scholar.google.co.uk

Leaf litter was gathered locally from the ground surface in the study area, particularly from the bases of *Acacia* shrubs. The collected litter was soaked in water and irradiated in a microwave oven for two minutes on maximum power setting. The microwave acted to kill any surface invertebrates present and assisted in the breakdown of organic matter. Wet leaf litter was added to the traps, which were kept in sealed containers until immediately prior to insertion into the drillholes to avoid desiccation of the litter. After the installation of traps, the opening of each drillhole was sealed to maintain humidity and to avoid entry of surface fauna.

Traps were recovered from each drillhole after a minimum of six weeks, as per EPA guidance, and stored in labelled zip-lock bags in order to maintain humidity and prevent desiccation of potential troglofauna specimens during transportation to Perth.

Fauna specimens were recovered from the traps using specially designed Tullgren funnel units. The leaf litter from each trap was placed in a sieve under an aluminium lamp containing a 25-watt globe. This created a temperature of approximately 30°C at the surface of the leaf litter. A funnel situated below the leaf litter collected the fauna as they fell, directing them into an attached vial of 100% ethanol. Leaf litter was left in the Tullgren funnels for a period of 24 hours, or until dry, after which time the bulked invertebrate sample was removed.

4.2.2 Haul Net Scraping

Troglofauna were also sampled using reinforced haul nets. These nets were constructed from 70 µm plankton mesh and had 100 mm apertures attached to a weighted catch jar. Sampling took place by lowering the net to the bottom of the site before being hauled slowly to the surface whilst scraping the edge of the drillhole. This dislodged any fauna on the vertical surface of the drillhole interior. Each site was scraped a minimum of four times, scraping each side of the drillhole. On completion, fauna specimens were preserved in-situ in 100% ethanol and individually labelled. The contents of the net, which included dry soil and root matter, were emptied into a uniquely labelled container. The container was then filled with 100% ethanol to preserve any specimens that may have been in the soil and root matter for later sorting in the field laboratory.

4.2.3 Data Management

Preliminary identification of subterranean fauna involved identification of specimens to order level, where possible, or separation of specimens into distinct morphotypes. Sorting was completed in Perth using dissecting microscopes (Olympus SZ40 and SZ61, magnification up to 40x). Morphotypes were then assigned a unique number based on drill hole name, date and method of collection. Specimens were preserved in 100% ethanol once separated out into morphotypes, which allows for both morphological and molecular analyses.

4.3 Molecular Analysis

Molecular analysis of collected schizomida was completed to inform determinations of the number of species present, and compare the results with those obtained during previous surveys in the Robe Valley and wider Pilbara region. Yvette Hitchen of Helix Molecular Solutions (Helix) completed the molecular sequencing. Specimens were sequenced for variation at the mitochondrial cytochrome oxidase subunit I gene (CO1; Appendix 2).

Dr Terrie Finston (of Helix) provided analysis and interpretation of the molecular data (Appendix 2). The molecular analysis used was a preliminary neighbour-joining approach using representative sequences from regional context data sets, followed by a phylogenetic analysis using the sequence data from this study (Appendix 2). This resulted in specimens from the current survey being placed into genetic lineages, which also included specimens from collections elsewhere in the region. Determination of putative species was then inferred from these genetic lineages based on the level of divergence between lineages of the same group (such as order or family), giving consideration to the variation within each lineage.

It should be noted that detailed morphological analysis was not completed for most specimens and the phylogenetic analysis was based on sequence data from a single gene. Therefore, all species arrived at by this approach should be considered putative unless previously described and fully determined by taxonomic specialists. Lineages with a divergence of less than 4.0% were considered a single species, whereas lineages with a divergence greater than 6.0% were considered separate distinct species for the purpose of this report, unless advised otherwise by Helix based on other data for the relevant taxonomic group. Lineages with intermediate divergences ranging from 4.0–6.0% were resolved to a preliminary level for the purposes of this report, with further input from Helix, and consideration to collection proximity, habitat characteristics and geology.

4.4 Categories of Conservation Significance

For the purpose of this report, the conservation significance of the fauna collected during this study, or records collated during the desktop review, was categorised as per Table 4.2.

Table 4.2: Conservation classification used within this report.

Category	Description
Conservation Significant species	Species listed as Priority, Schedule or Vulnerable at State or Federal levels.
Confirmed Short-range endemic (SRE) species *	Species where sufficient taxonomic expertise is available, and with adequate representation in WAM collections or genetic databases, that are known to be limited in distribution based on geological characteristics.
Potential SRE species *	Species where there is insufficient taxonomic knowledge or too limited a number of collections to determine SRE status. Habitat, morphology, molecular or taxonomic data deficient, but belonging to groups that may display short-range endemism.
Widespread (not an SRE) species *	Well-collected species that are typically taxonomically well resolved. Species are not confined by geological barriers.

* Category based on WAM SRE guidelines (WAM 2014).

4.5 Survey Design

4.5.1 Survey Timing and Personnel

Two phases of troglofauna sampling involving three field mobilisations were conducted at Mesa A and K between December 2016 and March 2017 (Table 4.3).

Table 4.3: Summary of field mobilisations completed for the Mesa A and K troglofauna survey.

Mobilisation	Dates	Phase	Purpose	Personnel
1	6th – 11th December, 2016	1	Troglofauna scraping Installation of troglofauna traps	Nicola Watson, Jacinta King
2	30th January – 2nd February, 2017	1	Troglofauna trap recovery	Jason Alexander
		2	Installation of troglofauna traps	
3	21st – 23rd March, 2017	2	Troglofauna trap recovery	Jason Alexander

Jason Alexander managed the study, with directional input from Garth Humphreys. Preliminary sorting of collected subterranean fauna was completed by Nicola Watson, Penny Brooshooft and Jacinta King. All personnel involved in the project were from Biota and collectively hold several decades of experience in subterranean fauna surveys.

4.5.2 Weather

Temperature and rainfall data were obtained from Mesa J mining operations approximately 38.6 km east-southeast of Mesa A, and 4 km southwest of Mesa K. Long-term climatological reference data (rainfall from 1971 – 2014, temperature data from 1971 – 2005) were obtained from the Bureau of Meteorological (BOM) weather station in Pannawonica (station number 5069, approximately 44.1 km east of Mesa A.

Sampling occurred during the 2016-17 wet season. No major rainfall events occurred in the three months prior to sampling (Figure 4.1). During the sampling period, however, conditions varied between Mesas A and K: A total of 110 mm of rain fell at Mesa A between January and March 2017 (December data not available), while Mesa K received 408 mm of rain between December 2016 and the end of the sampling period in March 2017, with over double the long-term average rainfall amount received in February (Figure 4.1).

The findings from previous surveys in the Robe valley and elsewhere suggest that dry conditions preceding installation of troglofauna traps may create less than ideal conditions for capturing troglofauna (Biota 2006a). There is also evidence that significant rain events during sampling (while traps remain in the ground) may result in a reduced colonisation of traps due to surface soil being washed into the traps and leaf litter being washed out of the traps.

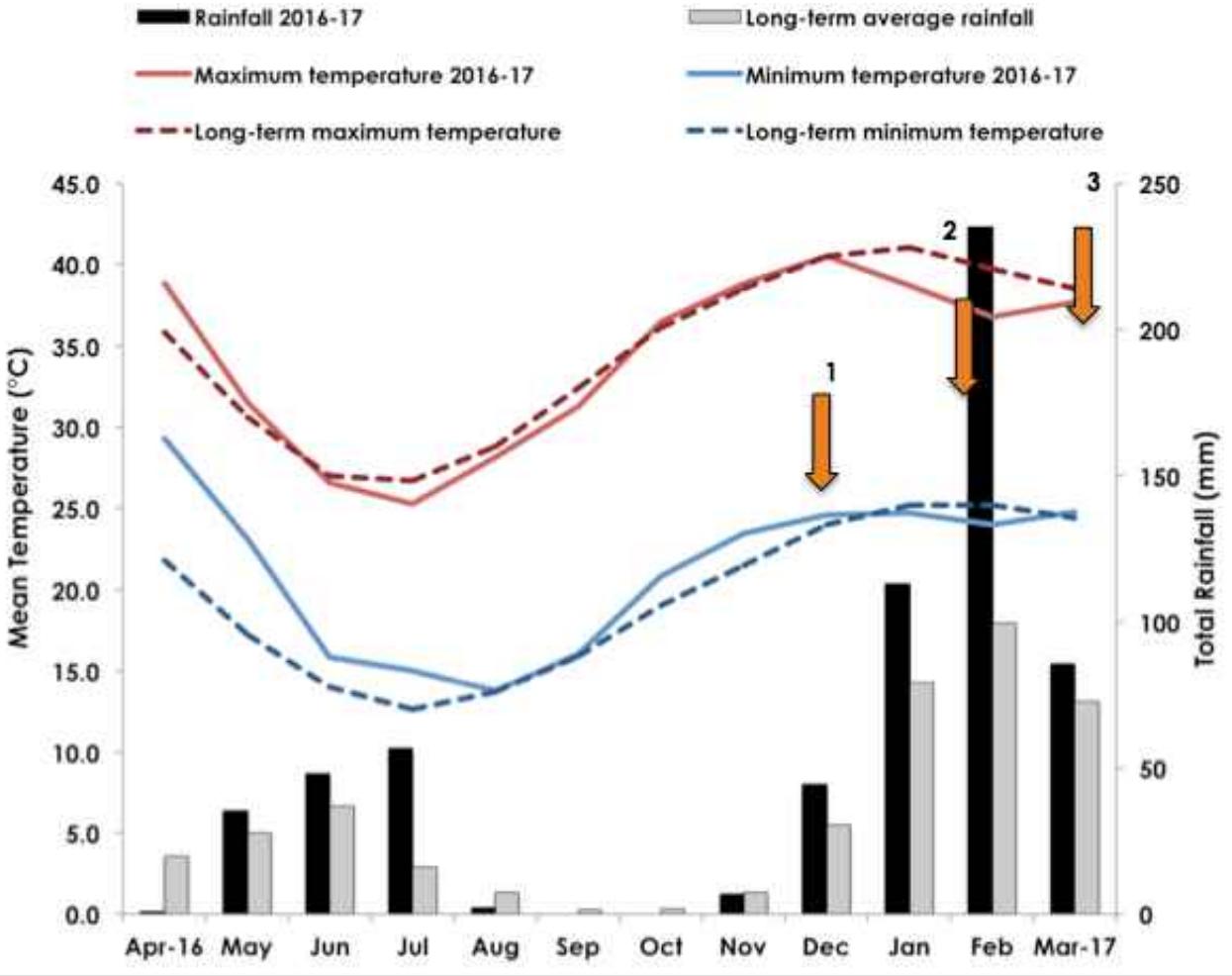

Figure 4.1: Climate and weather graph depicting long-term and monthly averages for the year preceding the final field mobilisation.

Long-term temperature data 1971-2005, rainfall data 1971-2014; arrows indicate field mobilisation timing as per Table 4.3.

4.5.3 Sampling Effort

A total of 19 drill holes were sampled within the Mesa A and Mesa K survey areas (14 and 5 sites respectively) (Table 4.4). On both phases two sites were unable to be accessed for installation or recovery of traps. As such a total of 17 sites were successfully sampled during Phase 1 and Phase 2, with 15 sites being sampled twice and four sites sampled once (Table 4.4). A total of 79 troglofauna traps were recovered from across both phases.

Haul net scraping was completed for 16 of the 19 sites prior to the installation of troglofauna traps. No haul net scraping was conducted during Phase 2 (Table 4.4).

Table 4.4: Troglofauna sampling sites within the Mesa A and Mesa K survey area.

Drill Hole Name	Location Description	Troglofauna Scrape	Traps		Notes
			Phase 1	Phase 2	
Mesa A					
MOB01A	Pit floor	Yes	2	2	
MOB01B	Pit floor	Yes	2	2	
MOB02A	Pit floor	-	0	2	No access for Phase 1.
MOB02B	Pit floor	-	0	2	No access for Phase 1.
MOB03A	Pit floor	Yes	2	1	1 trap* from Phase 2 under water, not processed.
MOB03B	Pit floor	Yes	2	2	
RC16MEA001	Pit floor	Yes	2	0	No access on recovery of Phase 2. Traps not retrieved*.
RC16MEA002	Pit floor	Yes	2	0	No access on recovery of Phase 2. Traps not retrieved*.
RC16MEA003	Pit floor	Yes	2	2	
RC16MEA004	Low grade waste dump	Yes	2	2	
RC16MEA005	Pit floor	Yes	3	2	1 trap* from Phase 2 under water, not processed.
RC16MEA006	Pit floor	Yes	3	2	1 trap* from Phase 2 under water, not processed.
RC16MEA007	Pit floor	-	3	3	
RC16MEA008	Portal breach	Yes	3	3	
Mesa K					
RC16MEK0001	Waste dump	Yes	1	1	
RC16MEK0002	In Pit - Higher RL than pit floor	Yes	3	3	
RC16MEK0003	Pit floor	Yes	3	3	
RC16MEK0004	Pit floor	Yes	3	3	
RC16MEK0005	Pit floor	Yes	3	3	
		Total number of traps installed	**41**	**45**	
		Total number of traps retrieved	**41**	**38**	
		Number of drill holes successfully sampled	**17**	**17**	

* - Not included in trap tally

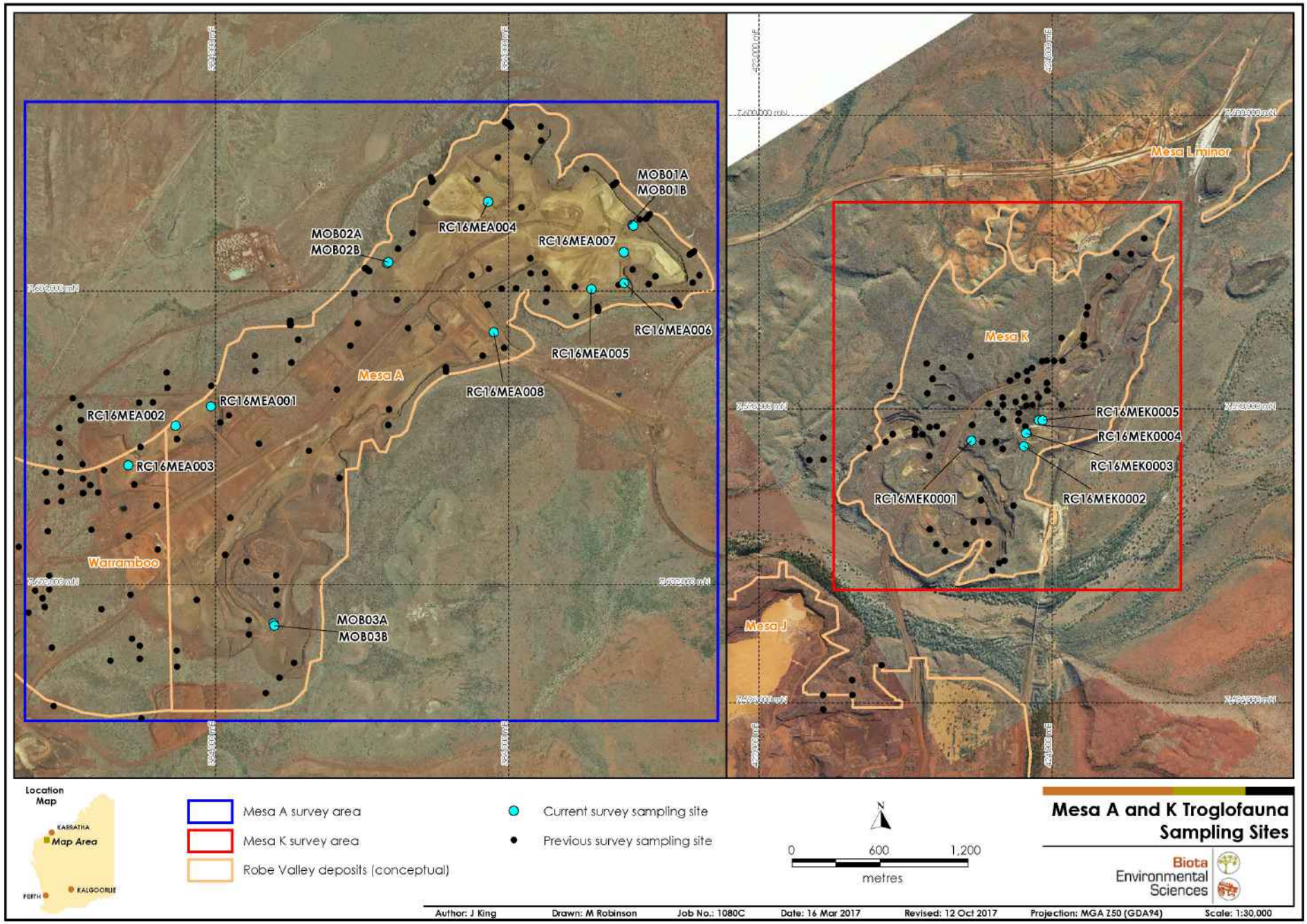

Figure 4.2: Location of current and previously sampled drill holes within and adjacent to the Mesa A and K survey area.

4.6 Limitations

Several limitations apply to this study, some of which are common functions of working on subterranean fauna, rather than functions of this specific study. These limitations include:

1. Sampling for troglofauna in the Robe Valley and wider Pilbara region relies on the use of drill holes, which are almost always installed as part of exploration drilling and thus focus on geological units of economical importance. This creates a bias in availability of drill holes for troglofauna sampling, as sampling tends to not extend far beyond the footprint of the target ore body and is focussed on particular rock types. This places limitations on determining wider species distributions and whether there are potential barriers to dispersal.
2. For most taxa, only adult specimens have diagnostic morphological characteristics necessary to be identified to species level. As juvenile specimens are often collected, this limited the level to which many specimens could be identified. These specimens, as well as those too damaged to identify have been classified as indeterminate species (sp. 'indet'). Indeterminate species (e.g. *Paradraculoides* sp. 'indet' and Thysanura sp. 'indet'), while reported on for transparency within the results, were removed from the discussion analysis. These specimens may represent multiple species or may equate to a species already known elsewhere.
3. A relatively small number of sampling locations were available to investigate the subterranean fauna habitat questions considered by this study (only a single site in the case of the low grade waste dump at Mesa A). With the high degree of ecological sampling effects and intra-site variation inherent in troglofauna data sets, this limits the power of the sampling design and thereby the conclusiveness with which this study can resolve habitat utilisation.

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5.0 Results

5.1 Desktop Review

5.1.1 Priority and Threatened Ecological Communities

Threatened Ecological Communities (TECs) are described by the Department of Parks and Wildlife as biological assemblages occurring in a particular habitat, which are under threat of modification or destruction from various processes (DEC 2013). Priority Ecological Communities (PECs) are biological (flora or fauna) communities that are recognised to be of significance, but do not meet the criteria for a TEC.

Two Priority Ecological Communities of relevance to the current study overlap both Mesas A and K (Table 5.1 and Figure 5.1). Both PECs are categorised as Priority One; Poorly-known ecological community. This category is defined as:

"*Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range*"(DEC 2013).

Table 5.1: Description of relevant PECs overlapping the survey area.

Community	Proximity to Survey Area
Subterranean invertebrate community of pisolitic hills in the Pilbara "Subterranean invertebrate communities of a series of isolated pisolitic mesas in the Robe Valley near Pannawonica in the Shire of Ashburton in the State's Pilbara Region. Includes Mesa A, B, C, G and K and mesas not yet surveyed. The mesas are remnants of old valley infill deposits of the palaeo Robe River. Mesas are flat topped hills with a hard laterised goethite cap (Biota 2006a). The cap is underlain by pisolite, which is made up of spherical accretions of iron minerals called pisoliths (the iron ore source), which often have small caverns and spaces between them. These interstices can be large enough to accommodate troglobitic fauna (Biota 2009b). It is assumed that the other ironstone hills also provide a similar habitat for troglobitic fauna that were located in these hills by Biota (Biota 2006a)."	Overlaps Mesa A < 5 kms south-east of Mesa K
Subterranean invertebrate communities of mesas in the Robe Valley region "Troglobitic faunal communities occur in extremely specialised habitats and appear to require the particular structure and hydrogeology associated with mesas (but also apparently with other ironstone hills in the Robe Valley Region; Biota 2006a) to provide a suitable humid habitat (EPA 2007). Specifically, the habitat is the humidified pisolitic strata (small round accretionary masses of rock). These troglobitic communities are believed to be relics of the late Miocene (23 to 5.3 million years BP), having arisen from tropical faunal lineages that descended into subterranean environments during the aridification of Australia (Biota 2006a). Short range endemism is common in these fauna (Biota 2006a). Eleven fauna taxa located in Mesa A, for example, was not located in any other mesa sampled. This high level of endemicity was the general pattern of distribution noted by Biota (Biota 2006a) for mesas and other hills in the Robe Valley that were thought to be likely habitat for troglofauna."	Overlaps Mesa A and Mesa K

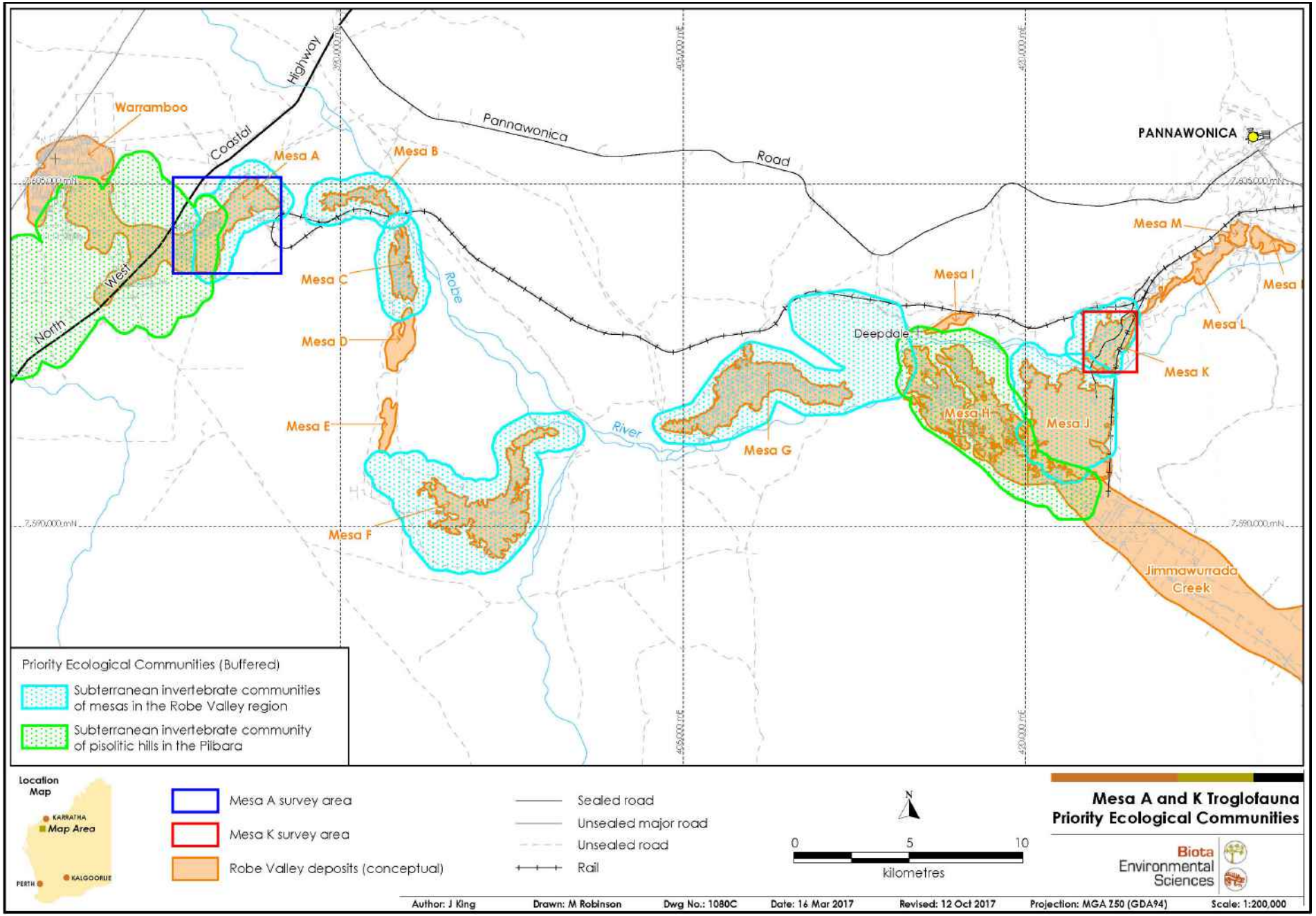

Figure 5.1: Relevant Priority Ecological Communities in the vicinity of the survey area.

5.1.2 Previous Relevant Surveys

Extensive subterranean fauna sampling has been conducted within the Robe Valley, including within the survey area. The focus of these surveys has included baseline studies, assessments and more recently, compliance monitoring. Five reports as listed below summarise the troglofauna sampling conducted at Mesa A. Eight reports as listed below summarise the sampling conducted at Mesa K:

5.1.2.1 Mesa A

- Mesa A Troglofauna Survey; Compilation of Sampling Results (Biota 2006b);
- Mesa A Troglobitic Fauna Compliance Monitoring 2012 (Biota 2012b);
- Mesa A Troglofauna Biennial Compliance Monitoring 2014 (MWH 2014a);
- Mesa A and Mesa B Annual Compliance Troglofauna Survey 2016 (Bennelongia 2017a); and
- Mesa A In-pit sampling July 2016 (Bennelongia 2017b).

5.1.2.2 Mesa K

- Mesa K Remnant Mining Project Troglobitic Fauna Survey (Biota 2007);
- Mesa K Troglobitic Fauna Compliance Monitoring 2010 (Biota 2011c);
- Mesa K Troglobitic Fauna Compliance Monitoring 2011 (Biota 2012a);
- Mesa K Troglobitic Fauna Compliance Monitoring 2012 (Biota 2012c);
- Mesa K Troglofauna Annual Compliance Monitoring 2013 (Outback Ecology 2014);
- Mesa K Troglofauna Annual Compliance Monitoring 2014 (MWH 2014b);
- Mesa K Remnant Mining Project: Troglofauna Compliance Report 2015 (Bennelongia 2015); and
- Mesa K Remnant Mining Project: Troglofauna Compliance Report 2016 (Bennelongia 2017c).

Collectively these sampling programmes represent 10 phases of sampling at Mesa A and 12 phases at Mesa K. These surveys have been reviewed and a summary of relevant information is presented in Table 5.2 and Table 5.3 for Mesa A and K, respectively. The location of previous surveys conducted within Mesas A and K is presented in Figure 5.2 and Figure 5.3.

A summary of the findings from these previous studies and a comparison with the current study is provided in Appendix 3.

Table 5.2: Summary of previous surveys completed within the current Mesa A survey area.

	Biota (2006b): Mesa A Troglofauna Survey; Compilation of Sampling Results	Biota (2012b): Mesa A Troglobitic Fauna Compliance Monitoring 2012	MWH (2014a): Mesa A Troglofauna Biennial Compliance Monitoring: 2014	Bennelongia (2017a): Mesa A and Mesa B Annual Compliance Troglofauna Survey 2016	Bennelongia (2017b): Mesa A In-pit sampling July 2016
Phases	**6**	**1**	**1**	**1**	**1**
Area Surveyed	Mesa A, B, C, F, G, H, 2402e, Todd Bore, Warramboo	Mesa A and B	Mesa A and B	Mesa A, B	Mesa A
Survey Timing	21 Nov' 2004 – 11 Apr' 2007	23 May - 20 Jul' 2012	25 Jun' - 5 Sep' 2014	20 Jul' - 18 Sep' 2016	20 Jul' - 18 Sep' 2016
Rain data (mm)					
Rain during sampling	44	51.6	0	5	5
Rain 3 months preceding	627.4	47.4	110	149	149
Sites sampled					
Trapped (Number of traps)	254 (776)	46 (135)	51 (158)	53 (84)	8 (32)
Scraped	0	0	50	42	0
Sites overlapping current survey area					
Trapped (Number of traps)	172 (523)	36 (105)	42 (136)	39 (44)	8 (32)
Scraped	0	0	41	37	0
Number of orders from study overlapping current survey area *	7	5	5	6	1

• Breakdown and comparison per phase in Appendix 3

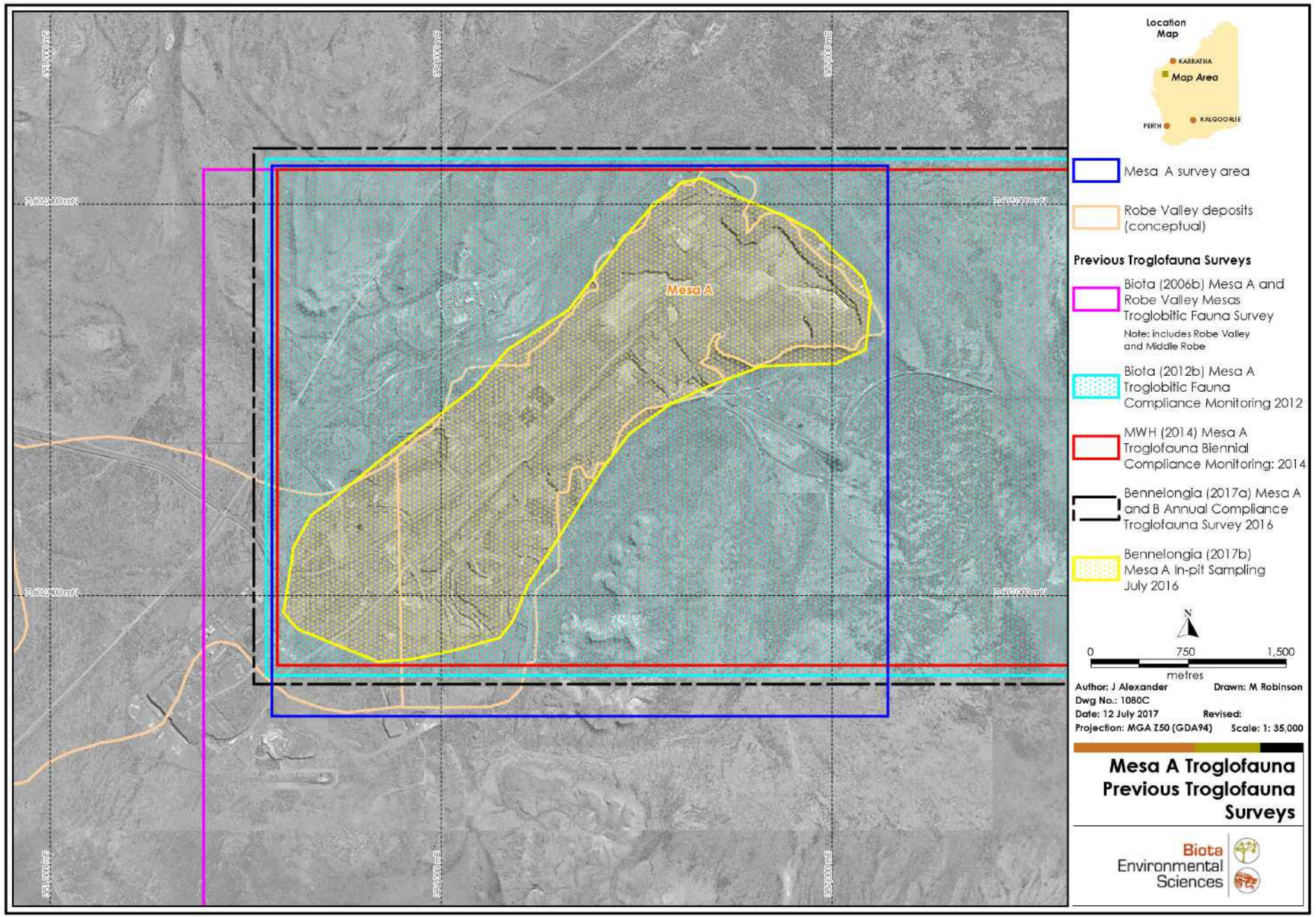

Figure 5.2: Summary of previous study locations in relation to the current survey – Mesa A.

Table 5.3: Summary of previous surveys completed within the current Mesa K survey area.

	Biota (2007): Mesa K Remnant Mining Project Troglobitic Fauna Survey	Biota (2011c): Mesa K Troglobitic Fauna Compliance Monitoring 2010	Biota (2012a): Mesa K Troglobitic Fauna Compliance Monitoring 2011	Biota (2012c): Mesa K Troglobitic Fauna Compliance Monitoring 2012	Outback Ecology (2014) Mesa K Troglofauna Annual Compliance Monitoring 2013	MWH (2014b): Mesa K Troglofauna Annual Compliance Monitoring 2014	Bennelongia (2015): Mesa K Remnant Mining Project: Troglofauna Compliance Report 2015	Bennelongia (2017c): Mesa K Remnant Mining Project: Troglofauna Compliance Report 2016
Phases	**5**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Area Surveyed	Mesa K	Mesa K	Mesa K	Mesa K	Mesa K	Mesa K	Mesa K	Mesa K
Survey Timing	2 May 2005 – 23 May 2007	4 Oct' - 30 Nov' 2010	18 Oct' - 30 Nov 2011	22 May - 18 Jul' 2012	16 Sep' - 14 Nov' 2013	25 Jun' - 5 Sep' 2014	15 Jun' - 11 Aug' 2015	20 Jul' - 18 Sep' 2016
Rain data (mm)								
Rain during sampling	947.6	1.6	0.6	43.2	7.6	0	14.2	5
Rain 3 months preceding	131.1	18.2	18	47.4	1	101.4	184.2	149
Sites sampled								
Trapped (Number of traps)	148 (440)	26 (77)	33 (92)	32 (82)	31 (82)	32 (72)	31 (32)	32 (31)
Scraped	0	0	0	0	0	30	31	31
Sites overlapping current survey area								
Trapped (Number of traps)	148 (440)	26 (77)	33 (92)	32 (82)	31 (82)	32 (72)	31 (32)	32 (31)
Scraped	0	0	0	0	0	30	31	31
Number of orders from study overlapping current survey area *	7	3	5	6	4	4	6	5

• Breakdown and comparison per phase in Appendix 3

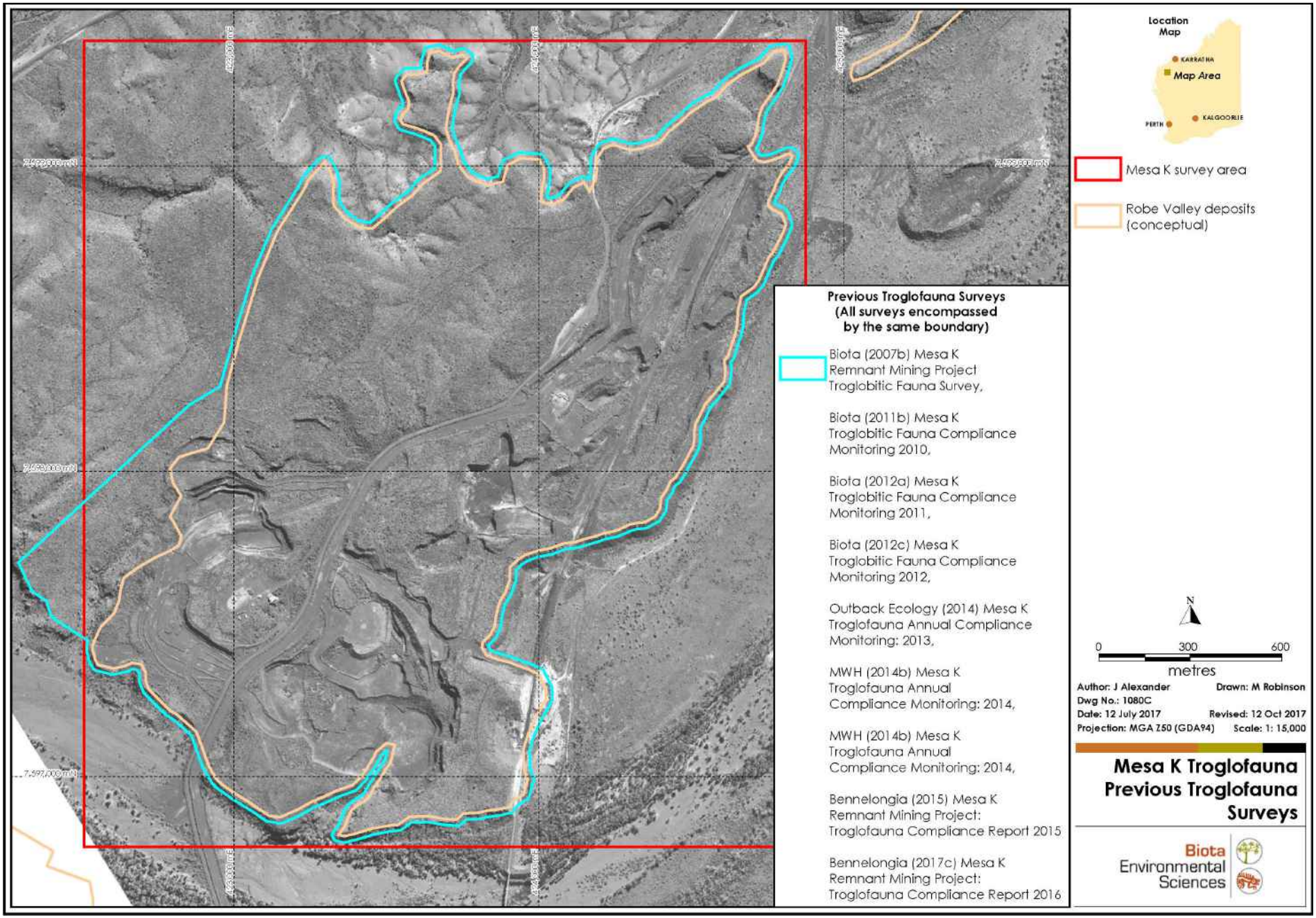

Figure 5.3: Summary of previous study locations in relation to the current survey – Mesa K.

5.1.3 Previously Recorded Fauna

5.1.3.1 Mesa A

A total of 383 specimens were documented from Mesa A from past surveys (Table 5.4 and Figure 5.4). Of these, 198 specimens could not be identified to species level, and are therefore not considered further. These indeterminate records are typically unable to be determined to species levels as they represent juvenile or damaged specimens, or a lack of taxonomic expertise exists for the respective groups. The remaining 185 specimens were identified as belonging to 24 species, of which six have been formally described. Eighteen species are undescribed. Complete details of all previous records are displayed in Appendix 3.

The most commonly collected species was the schizomid *Paradraculoides anachoretus*, representing 65.9% of identified records. This species, as well as four pseudoscorpion species, *Lagynochthonius asema*, *Tyrannochthonius* sp. 'Mesa A', *Ideoblothrus linnaei* and *Ideoblothrus* sp. 'Mesa A' are all listed as conservation significant. These are discussed further in Section 6.1.

Specimens belonging to the orders Polyxenida and Blattodea, and the pseudoscorpion species *Tyrannochthonius aridus* have been documented as having widespread spatial distributions throughout the Pilbara. These specimens are likely troglophilic or epigean and therefore not directly relevant to this troglofauna assessment.

5.1.3.2 Mesa K

The Mesa K desktop review yielded 363 specimens (Table 5.5 and Figure 5.5). Sixty-five specimens were unable to be identified to species level and are therefore not considered further. The remaining 298 specimens were identified as belonging to 22 species. Four species have previously been formally described, and the remaining 18 taxa are currently undescribed. Complete details of all previous records are displayed in Appendix 3.

The schizomid species *Paradraculoides kryptus* was most commonly recorded, representing 50.5% of identified Mesa K records. This species is the only listed conservation significant fauna identified from the desktop review for Mesa K.

The geophilid centipede *Ballophilus australiae*, which has been recorded from Mesa K, is widespread throughout Australia and is epigean. Specimens from the order Polyxenida (corresponding to the species *Lophoturus madecassus*) were also documented from Mesa K. As with the Mesa A results, these taxa are widespread and are likely troglophilic or edaphobitic.

Table 5.4: Previously recorded troglofauna from Mesa A.

Taxonomy			Number Collected	Drill holes
Order	**Family**	**Species**		
Araneae	Indeterminate	Araneae sp. 'indet'	3	MEADC2517A, MEARC4283, MEARC4305
	Oonopidae	*Prethopalpus scanloni*	1	MEARC4279
	Pholcidae	*Trichocyclus* sp. 'Mesa A'	1	MEADC2493
Blattodea	Indeterminate	Blattodea sp. 'indet'	3	MEARC4294, MEARC4304
	Nocticolidae	*Nocticola* sp. 'indet'	1	MEARC4018
		Nocticola sp. 'OES11'	2	MEARC4305
Coleoptera	Indeterminate	Coleoptera sp. 'indet'	1	MEARC4038
	Curculionidae	Curculionidae sp. 'B02'	2	MEARC4279, MEARC4297
		Curculionidae sp. 'OES10'	5	MEARC4294, MEARC4304
	Staphylinidae	Staphylinidae sp. 'indet'	9	MEA4155
		Staphylinidae sp. 'MesaKOES2'	1	MEARC4297
Diplura	Indeterminate	Diplura sp. 'Indet'	1	MEARC2702
	Campodeidae	Campodeidae sp. 'nov. gen.'	1	MEARC2656
		Campodeidae sp. 'OES3'	1	MEARC4279
	Japygidae	Japygidae sp. 'indet'	2	MEADC2496, MEADC2497
		Japyx sp. 'indet'	1	MEARC2740
	Projapygidae	Projapygidae nov. gen. sp. 'Mesa A'	2	MEA4318, MEARC4024
Isopoda	Indeterminate	Isopoda sp. 'indet'	5	MEADC2517A, MEARC4281, MEARC4295, MEARC4303
	Armadillidae	Armadillidae sp. 'MesaAOES19'	1	MEARC4293
	Oniscidae	*Hanoniscus* sp. 'MesaAOES22'	5	MEARC4290, MEARC4299, MEARC4304
Polydesmida	Haplodesmidae	Haplodesmidae sp. 'indet'	1	MEA4296
		Haplodesmidae nov. gen. sp. '1'	1	MEADC2497
Polyxenida	Indeterminate	Polyxenida sp. 'indet'	38	MEA2513, MEA4318, MEA2999
	Lophoproctidae	*Lophoturus madecassus*	2	MEARC4281, MEARC4304
		Lophoproctidae sp. 'indet'	66	MEARC4026, MEARC4282, MEARC4296, MEARC4298, MEARC4299, MEARC4301, MEARC4303
Pseudoscorpiones	Chthoniidae	Chthoniidae sp. 'indet'	1	MEARC4279
		*Lagynochthonius asema**	8	MEA4026, MEA4306, MEARC4278, MEARC4284, MEARC4287, MEARC4292, MEARC4296
		Tyrannochthonius aridus	1	MEARC4296
		Tyrannochthonius sp. 'indet'	1	MEARC4047

Taxonomy			Number Collected	Drill holes
Order	**Family**	**Species**		
		Tyrannochthonius sp. 'Mesa A'*	1	MEA4476
	Syarinidae	*Ideoblothrus* sp. 'indet'	5	MEARC2856, MEARC2927, MEARC4284, MEARC4290, MEARC4291
		*Ideoblothrus linnaei**	4	MEARC2927, MEARC4018, MEARC4281, MEARC4316
		Ideoblothrus sp. 'Mesa A'*	6	MEA2856, MEA2988, MEA4063, MEARC4301
		Ideoblothrus sp. 'Mesa A2'	1	MEARC4038
Scolopendromorpha	Indeterminate	Scolopendrida sp. 'indet'	3	MEARC2560, MEARC3073, MEARC4016
	Cryptopidae	*Cryptops* sp. 'indet'	6	MEADC2497, MEARC2858, MEARC4284, MEARC4285, MEARC4296, MEARC4307
		Cryptops sp. 'nov'	1	MEADC2500
Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	48	MEADC2517A, MEADC4151, MEARC2740, MEARC2927, MEARC3042, MEARC4038, MEARC4278, MEARC4279, MEARC4280, MEARC4281, MEARC4283, MEARC4284, MEARC4290, MEARC4292, MEARC4293, MEARC4294, MEARC4296, MEARC4298, MEARC4299, MEARC4301, MEARC4304, MOB3A, MOB3B,
		*Paradraculoides anachoretus**	122	A1149, MEA11, MEA2504, MEA2827, MEA2828, MEA2927, MEA2988, MEA3092, MEA4026, MEA4027, MEA4144, MEA4150, MEA4151, MEA4155, MEA4284, MEA4296, MEA4306, MEA4307, MEADC2492, MEADC2497, MEADC2500, MEADC2501, MEADC2517A, MEADC2582, MEADC3188, MEARC2497, MEARC2582, MEARC2611, MEARC2702, MEARC2740, MEARC2858, MEARC2934, MEARC3066, MEARC3073, MEARC4018, MEARC4026, MEARC4151, MEARC4280, MEARC4281, MEARC4283, MEARC4284, MEARC4290, MEARC4291, MEARC4292, MEARC4293, MEARC4294, MEARC4295, MEARC4296, MEARC4299, MEARC4304, MEARC4305, MEARC4306, MEARC4422
		Paradraculoides sp. 'SCH034'	3	MEADC4018, MEARC4151, RC16MEA004
Thysanura	Indeterminate	Thysanura sp. 'Indet'	1	MEA2513
	Nicoletiidae	Nicoletiidae sp. 'indet'	2	MEAD4151, MEARC4305
		Trinemura sp. 'Mesa A 1'	7	MEADC2496, MEADC2501, MEADC2517A, MEADC2523, MEADC2582, MEARC3098
		Trinemura sp. 'Mesa A 2'	5	MEARC4296, MEARC4305

* Conservation significant fauna.

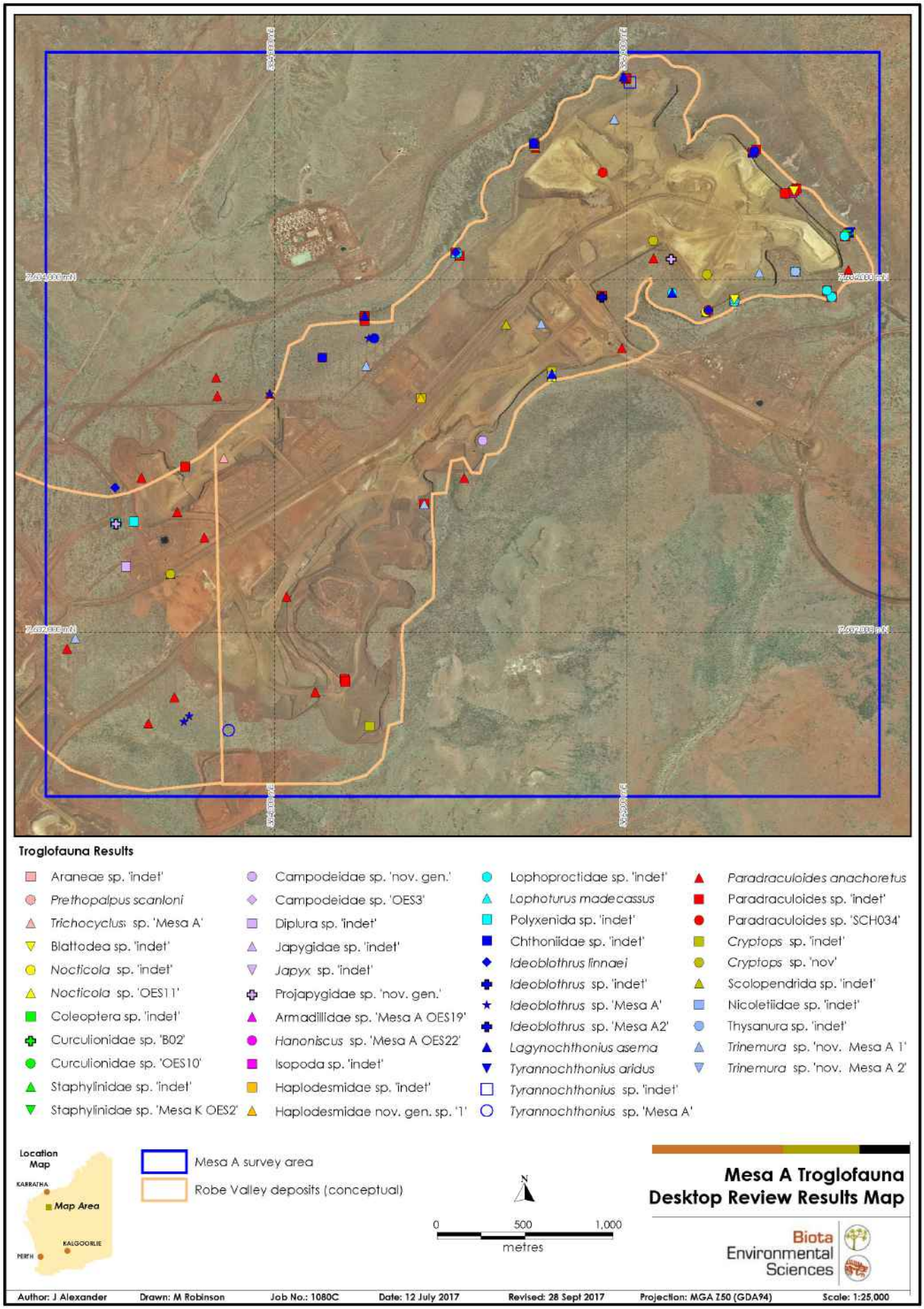

Figure 5.4: Previous sampling locations and recorded troglofauna for Mesa A.

Table 5.5: Previously recorded troglofauna from Mesa K.

Taxonomy			Number Collected	Drill holes
Order	**Family**	**Species**		
Araneae	Micropholcommatidae	Micropholcommatidae sp. 'WAMARA001'	1	MEKRC1703
Blattodea	Nocticolidae	*Nocticola* 'OES11'	7	K0740, K0989, K0996, MEK1718, MEK1731
Cephalostigmata	Indeterminate	Symphyla sp. 'Indet'	1	MEKRC1731
Coleoptera	Ptiliidae	*Ptinella* sp. 'B01'	13	MEK1718, MEK1735
	Curculionidae	Cryptorhynchinae sp. 'B04'	2	MEK1478, MEK1486
		Curculionidae sp. 'OES10'	1	MEK1486
		Curculionidae gen. nov. sp. 'B01'	1	MEK1486
Diplura	Japygidae	*Heterojapyx* sp. 'nov'	1	MEK1478
Geophilomorpha	Ballophilidae	*Ballophilus australiae*	1	MEK1731
Isopoda	Oniscidae	*Hanoniscus* sp. '1'	4	MEK1337, K1074, MEK1486
	Philosciidae	*Andricophiloscia* sp. 'B19'	2	K0739
Polyxenida	Lophoproctidae	*Lophoturus madecassus*	60	K0502, K0607, K0672, K0989, K0996, MEK1478, MEK1486, MEK1558, MEK1703, MEK1712, MEK1718, MEK1731
Polydesmida	Indeterminate	Polydesmida sp. "Indet'	1	MEK1712
Pseudoscorpiones	Atemnidae	*Paratemnoides* sp. 'Indet'	1	K0607
		Oratemnus sp. 'PSE081'	3	K0996, K1074, MEK1735
	Chthoniidae	*Lagynochthonius* sp. 'Mesa K'	4	MEK1685, MEK1689, MEK1731, MEK1735
	Hyidae	*Indohya* sp. 'Mesa K'	6	K0740, K0502, K0607, MEK1696, MEK1558
	Olpiidae	*Linnaeolpium linnaei*	1	K0502
	Syarinidae	*Ideoblothrus* sp. 'Mesa K'	2	K0996, MEK1685A
		Ideoblothrus sp. 'indet'	1	K0996
		Ideoblothrus sp. 'nov'	1	MEK1721
Schizomida	Hubbardiidae	*Paradraculoides kryptus**	150	K0502, K0607, K0672, K0739, K0740, K0948, K0968, K0989, K0996, K1074, K1328, MEK0672, MEK0739, MEK1337, MEK1478, MEK1486, MEK1558, MEK1570A, MEK1685, MEK1689A, MEK1696, MEK1697, MEK1702, MEK1703, MEK1712, MEK1718, MEK1724, MEK1728, MEK1731, MEK1732, MEK1735, MEK1735A
		Paradraculoides sp. 'Indet'	59	K0502, K0557, K0607, K0672, K0740, K0989, K0996, K1066, K1068, K1074, K1337, K1598, MEK1558, MEK1570, MEK1609, MEK1685, MEK1689A, MEK1697, MEK1703, MEK1712, MEK1718, MEK1721, MEK1724, MEK1731, MEK1732, MEK1735, MEK1735a, OPK01
Scolopendromorpha	Cryptoptidae	*Cryptops* sp. '1'	2	K0502, MEK1302, MEK1731

Taxonomy			Number Collected	Drill holes
Order	**Family**	**Species**		
		Cryptops sp. 'B47'	1	MEK1735
	Scolopendridae	Scolopendridae sp. 'B03'	1	K0502
	Dalodesmidae	Dalodesmidae sp. 'B08'	34	MEK1609, MEK1703
Spirobolida	Indeterminate	Spirobolida sp. 'Indet'	1	K0502
Thysanura	Indeterminate	Thysanura sp.'Indet'	1	MEK1731

* Conservation significant fauna.

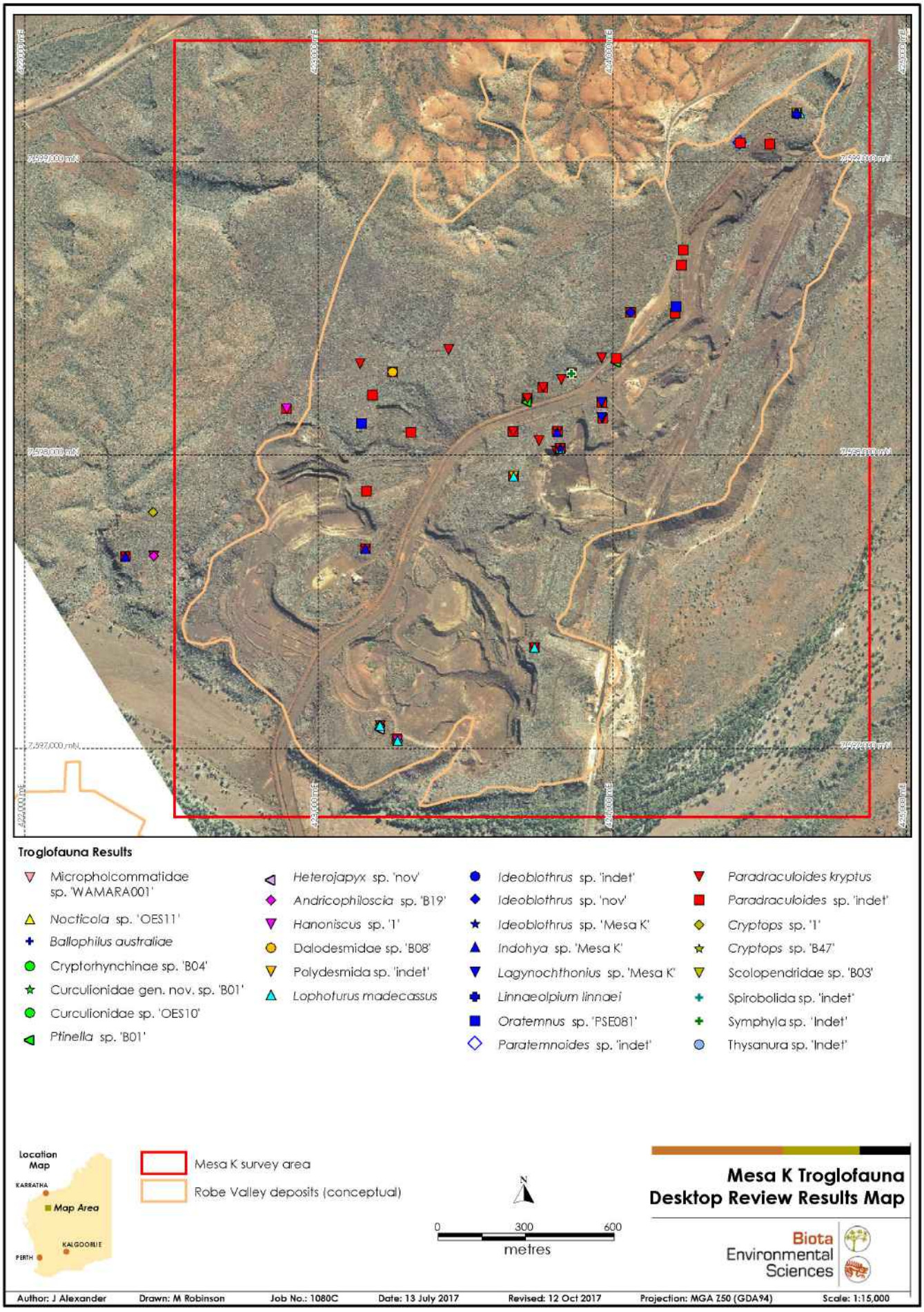

Figure 5.5: Previous sampling locations and recorded troglofauna for Mesa K.

5.2 Survey Results

5.2.1 Mesa A

A complete account of all specimens recorded, including surface and edaphobitic specimens, is presented in Appendix 4. Only troglomorphic fauna records from the survey area will be discussed further.

5.2.1.1 Schizomida

Four schizomid specimens were recorded from drillhole RC16MEA004 at Mesa A (Table 5.6), all of which were recorded during Phase 2. Genetic analysis of collected Schizomida determined the presence of two distinct lineages, with divergence levels indicating they represent distinct species (Table 5.6, Plate 5.1, Plate 5.2, Figure 5.7).

Table 5.6: Schizomida records from Mesa A.

Family	Genetic Lineage	Species Name	Number Recorded	Drillhole
Hubbardiidae	Schizomida SCH034	*Paradraculoides* sp. 'SCH034'	3	RC16MEA004
	Schizomida SCH063	*Paradraculoides anachoretus*	1	RC16MEA004

Plate 5.1: *Paradraculoides* sp. 'SCH034' .

Plate 5.2: *Paradraculoides anachoretus* .

Paradraculoides sp. 'SCH034' differs from *Paradraculoides anachoretus* by between 5.6% and 6.3% genetic divergence, and from their next closest related reference species, *Paradraculoides* sp. 'SCH003' (Warramboo) and *Paradraculoides bythius* (Mesa B), by 7.7% and 8.4% genetic divergence respectively.

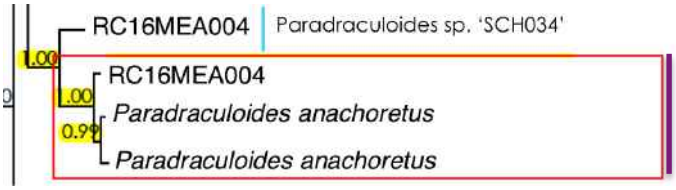

Figure 5.6: Excerpt of the Helix Bayesian analysis of CO1 haplotypes of the family Hubbardiidae collected from Mesa A.
(Numbers on major nodes correspond to posterior probabilities; values <50% are not shown. Coloured blocks indicate specimens belonging to a single species.)

Paradraculoides anachoretus has been widely recorded from Mesa A and is considered to be endemic to the mesa. *Paradraculoides* sp. 'SCH034' was recorded from RC16MEA004, which intercepts both the low grade waste dump and strata beneath the pit floor. This species is also known from two other sites within the MEZ. Sequencing of the schizomids recorded from Mesa A during the current study also included a juvenile specimen recorded from Mesa A by Bennelongia (2017b).

This specimen was originally only identified to genus level based on morphology, but genetic analysis undertaken in the current study has determined that it too belongs to *Paradraculoides* sp. 'SCH034', and was recorded from the same drillhole, RC16MEA004 (Appendix 2).

5.2.2 Mesa K

No troglomorphic specimens were collected from Mesa K.

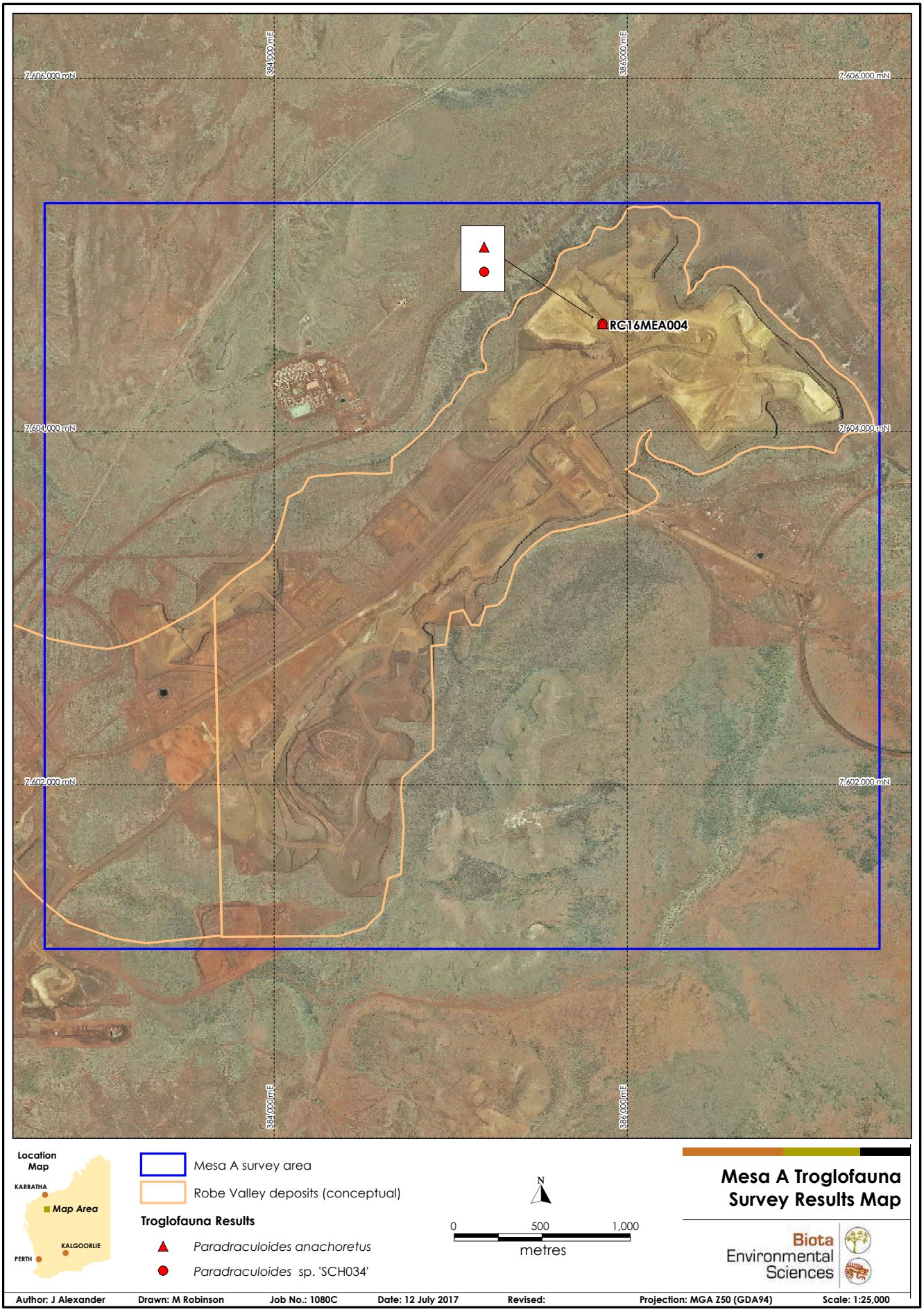

Figure 5.7: Location of schizomid records collected from Mesa A during current survey.

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6.0 Discussion

6.1 Conservation Significance and Distribution of In-pit Records

6.1.1 Mesa A

A total of 22 taxa identified to species level have been recorded from the Mesa A deposit. Five of these (one schizomid and four pseudoscorpion taxa) represent species that are of conservation significance:

1. ***Paradraculoides anachoretus*** (Schedule 3): Over 120 specimens known only from Mesa A.
2. ***Ideoblothrus linnaei*** (Priority 1): Four specimens known only from Mesa A.
3. ***Ideoblothrus* sp. 'Mesa A'** (Priority 1): Six specimens known only from Mesa A.
4. ***Lagynochthonius asema*** (Priority 1): Eight specimens known only from Mesa A.
5. ***Tyrannochthonius* sp. 'Mesa A'** (Priority 1): One specimen known only from Mesa A.

Of these five conservation significant species, one was recorded from in-pit sampling at Mesa A during the current survey, with a single *Paradraculoides anachoretus* specimen collected from RC16MEA004. This species is well represented and commonly recorded throughout Mesa A, with more than 120 records confirmed (Table 5.4). A separate species, *Paradraculoides* sp. 'SCH034', was collected from the same drillhole, RC16MEA004, during the current survey. The presence of two species of schizomid within the Mesa A landform is notable, as previous sampling has indicated the presence of only one species per mesa landform (Harvey et al. 2008). The collection of *Paradraculoides anachoretus* from the same drillhole indicates that the two species occur in sympatry, though the possibility exists that the habitats of the two species are vertically separated and thus effectively precluding sympatry. Six specimens from the specied *Paradraculoides* sp. 'SCH034' have been recorded, including the specimen collected by Rio Tinto during a previous survey at Mesa A (Bennelongia 2017b).

A summary of schizomid species recorded from Mesa A during the current survey, including their conservation status and known distribution is presented in Table 6.1. All Schizomida from the Robe Valley mesas are considered strongly obligate troglofauna, and as such *Paradraculoides* sp. 'SCH034' is unlikely to have a distribution greater than the Mesa A landform. *Paradraculoides* sp. 'SCH034' therefore currently represents a potential SRE species (Table 6.1). The distribution of previously recorded conservation significant and potential SRE troglofauna species recorded at Mesa A (including those from the current study) is presented in Figure 6.1.

Table 6.1: Summary of species recorded from Mesa A for the current Scope of Work, including their conservation status and distribution.

(Coordinates in GDA94, Zone 50; A summary of the WAM SRE categories is located in Appendix 4).

Species Name	Distribution (km^2)	Collection Representation*	New Species	Singleton Record ∞	SRE Sub-Categories ^	Notes
Conservation Significant Species						
Paradraculoides anachoretus	5.7	Good	-	-	-	Listed as Schedule 3. Over 120 specimens known from Mesa A distribution.
Potential SRE Species						
Paradraculoides sp. 'SCH034'	0.24	Fair	X	X	A. Data Deficient D. Molecular evidence	Multiple specimens from single location.

* Poor: <5 specimens, Fair: 5 – 15, Good: >15.

∞ includes multiple specimens collected from single site.

^ A. Data Deficient, B. Habitat Indicators, C. Morphology indicators, D. Molecular Evidence, E. Research and Expertise (more detail in Appendix 5).

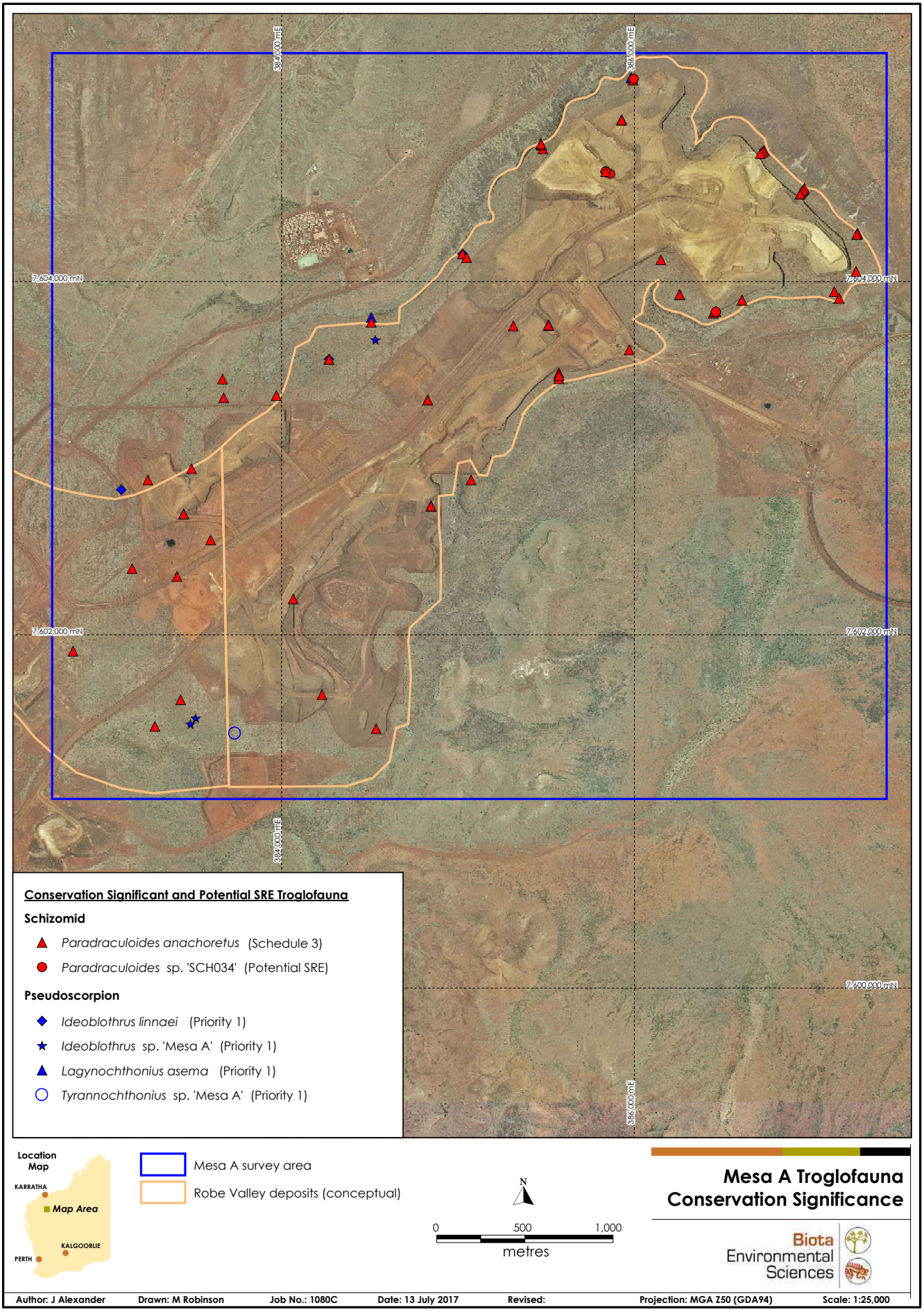

Figure 6.1: Distribution of conservation significant and potential SRE troglofauna species at Mesa A.

6.1.2 Mesa K

A total of 22 species have been recorded from the Mesa K deposit. The current survey did not add any further records to this total. Of the recorded taxa, only one species, the schizomid *Paradraculoides kryptus* is listed as being of conservation significance. This species is listed as Schedule 3 fauna, with 120 specimens recorded solely from Mesa K (Table 5.5). The distribution of this species at Mesa K is presented in Figure 6.2.

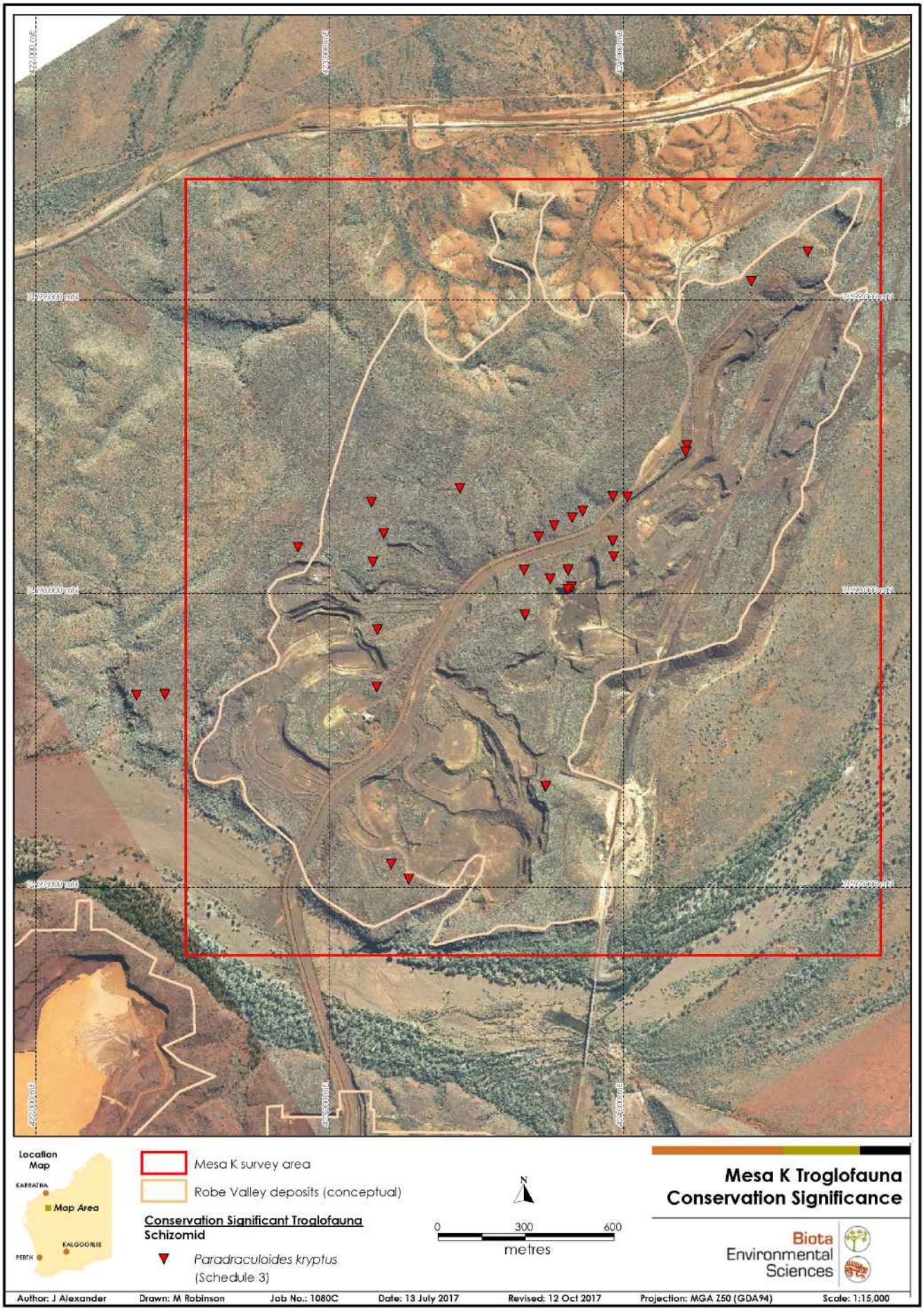

Figure 6.2: Distribution of conservation significant troglofauna species at Mesa K.

6.2 Troglofauna Communities of In-pit Habitats

Currently, insufficient data exist to allow for a robust analysis comparing the results of in-pit sampling at Mesa A with the results of sampling within the MEZ and prior to mining operations, but as a minimum, this study has confirmed that both schizomid species recorded in-pit also occur within the MEZ. Most sampling effort since operations commenced has focused on reference area sampling, creating a biased data set.

Some observations can be made from the results of the in-pit sampling. From the very limited data available, it is possible troglofauna may be utilising the low-grade waste dump at Mesa A as habitat. However, information provided by Rio Tinto indicates that the sampled drill hole was also drilled beyond the base of the waste dump and into intact troglofauna habitat below. This introduces the more likely possibility that the troglobites recorded from this site may have entered the drillhole from intact habitat at depth, rather than truly utilising the waste dump as habitat.

7.0 Glossary

Edaphobite	Deep soil inhabitant.
Endemic	Native to or confined to a certain region.
EPA	Environmental Protection Authority of Western Australia.
Epigean	Fauna from above the soil level.
Karst	Soluble-rock landscape; terrain with distinctive hydrology and landforms arising from a combination of high rock solubility and well-developed secondary porosity.
Mesocaverns	Underground voids in the size range 0.1 – 20cm, especially in karst and volcanic substrates.
Pisolite	Rock composed of pisoliths.
Short-Range Endemic (SRE)	A species that has a naturally small distribution and is often characterised by having poor dispersal capabilities, confinement to disjunct habitats and low fecundity. WAM guidelines for determining SRE status in Appendix 5.
Species Complex	A group of closely related species currently placed within a single species name.
Stygobite / Stygofauna	Fauna inhabiting the various types of groundwater.
Sympatry	The occurrence of populations in overlapping geographical areas, but without interbreeding.
Troglobite / Troglofauna	Species that do not exist outside caves. They may, however, occur in the superficial underground compartment or in the upper hypogean zone.
Troglophile / Troglophilic	Species that utilise, but are not restricted to, subterranean environments. Able to use surface environments for dispersal.

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Appendix 1

Licence to take Fauna for Scientific Purposes (Licence: 08-000238-1)

DEPARTMENT OF PARKS AND WILDLIFE

Department of Parks and Wildlife

Enquiries: 17 DICK PERRY AVE, KENSINGTON, WESTERN AUSTRALIA
Telephone: 08 9219 9000
Facsimile: 08 9219 8242
Web Site: https://wildlifelicensing.dpaw.wa.gov.au/
Correspondance: **Locked Bag 30**
Bentley Delivery Centre WA 6983

Wildlife Conservation Act 1950

REGULATION 17

Regulation 17 – Licence to take fauna for scientific purposes (Regulation 17 - Standard)

The undermentioned person may take fauna for research or other scientific purposes and where authorised, keep it in captivity, subject to the following and attached conditions, which may be added to, suspended or otherwise varied as considered fit.

Director General

Conditions

1 The licensee shall comply with the provisions of the Wildlife Conservation Act 1950, Wildlife Conservation Regulations 1970 and any Notices in force under this legislation.

2 The licensee shall take fauna only in the manner stated on the endorsed Regulation 17 licence application form and endorsed related correspondence.

3 Unless specifically authorised in the conditions of this Licence or otherwise in writing by the Director General, species of fauna declared as likely to become extinct, rare or otherwise in need of special protection shall not be taken.

4 Any by-catch of fauna, which is declared to be rare, likely to become extinct, or otherwise in need of special protection shall be released immediately at the point of capture. Where such fauna taken under this licence is injured or deceased, the licensee shall contact the Department's Wildlife Licensing Section for advice on disposal. Records must be kept of any such fauna so captured and details are to be included in the report required under further condition below.

5 Any interaction involving Gazetted Threatened Fauna that may be harmful to the fauna and/or invasive may require approval from the Commonwealth Department of the Environment ph 02 6274 1111. Interaction with such species is controlled by the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 and Environment Protection and Biodiversity Conservation Regulations 2000 as well as the Wildlife Conservation Act 1950 and Wildlife Conservation Regulations 1970.

6 No fauna shall be taken in areas where it would impinge on pre-existing scientific research programs.

7 Except in the case of approved lethal traps, the licensee shall ensure that measures are taken in the capture and handling of fauna to prevent injury or mortality resulting from that capture or handling. Where traps or other mechanical means or devices are used to capture fauna these shall be deployed so as to prevent exposure of trapped animals to ants and debilitating weather conditions and inspected at regular intervals throughout each day of their use. At the conclusion of research all markers used, and signs and structures erected by the licensee shall be removed and the environment returned to its original condition.

8 Not more than ten specimens of any one protected species of fauna shall be taken and removed from any location less than 20km apart. Where exceptional circumstances make it necessary to take a larger number of specimens from a particular location in order to obtain adequate statistical data, the collector must proceed with circumspection and justify their actions to the Director General in advance.

9 The licensee shall not release any fauna or their progeny in any area where it does not naturally occur, nor hand such fauna over to any other person or authority unless approved by the Director General, nor dispose of the remains of such fauna in any manner likely to confuse the natural or present day distribution of the species.

10 Bioprospecting involving the removal of sample aquatic and terrestrial organisms for chemical extraction and bioactivity screening shall not be conducted without specific written approval by the Director General.

11 No fauna shall be taken from any CALM land, as defined in the Conservation and Land Management Regulations 2002, without prior written approval of the Director General. No fauna shall be taken from any public land without the prior written approval of the Government Authority managing that land.

12 The licensee shall not enter upon any private property or pastoral lease for the purposes of this licence, nor take any fauna from any private land or pastoral lease without the prior consent in writing of the owner or occupier. Similarly, in the case of Aboriginal lands, the licensee must not enter upon or take fauna from such lands without the written approval of the Department of Aboriginal Affairs and/or the relevant native title holders or applicants.

13 Copies of this licence and any written approval or consent required by conditions of this licence must be carried by the licensee and any person/s authorised under the licence at all times when conducting activities relevant to the licence

Department of Parks and Wildlife

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and must be presented to an authorised officer of the Department upon request.

14 All holotypes and syntypes and a half share of paratypes of species or subspecies permitted to be permanently taken under this licence shall be donated to the Western Australian Museum. Duplicates (one pair in each case) of any species collected, which represents a significant extension of geographic range shall upon request be donated to the Western Australian Museum.

15 To prevent any unnecessary collecting in this State, all specimens and material taken and retained under the authority of this license shall, upon request, be loaned to the Western Australian Museum. Any unused portion or portions of any specimen collected under the authority of this license shall be offered to the Western Australian Museum for inclusion in its collection or made available to other scientific workers if so required.

16 Within one month of the expiration of this licence, the holder shall submit an electronic return into the department's Wildlife Licensing System, detailing the locality, site, geocode, date and number of each species of fauna captured, sighted or vouchered during the currency of the licence. A copy of any paper, report or thesis resulting from the research shall upon completion be lodged with the Director General.

Purpose

Troglofauna and Stygofauna survey for environmental impact assessment via plankton net hauls, PVC leaf-litter traps and net haul scrapings in accordance with EPA guidance statement 54a

Locations

Warramboo, Mesa A, Mesa C, Mesa K

Authorised Person

Surname	Given name(s)
Alexander	Jason
Watson	Nicola
King	Jacinta
Teale	Roy
Kamien	Daniel
Schmidt	Sylvie
Humphreys	Garth
Werner	Scott
Keirle	David
Ford	Stewart
Greenham	Michael
Adam	Cassie

DEPARTMENT OF PARKS AND WILDLIFE

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Date of Issue 21/02/2017
Valid From 21/02/2017
Date of Expiry 20/02/2018

Licensee: Ms Penny Brooshooft
Address Biota Environmental Sciences
PO Box 155
Leederville WA 6903
Australia

Issued by a Wildlife Licensing Officer of the Department of Parks and Wildlife under delegation from the Minister for Environment pursuant to section 133(1) of the Conservation and Land Management Act 1984.

Appendix 2

Molecular Analysis Report

Summary of Helix Sequences

Tracking Number	Mesa	Taxon	Helix ID	WAM ID	lineage	Notes
RC16MEC0177-20170309-01	C	Araneae	LI29	T144228	AG001	
MEAWO4088-20170307-01	C	Diplura	LI30		DJA011	No WAM number. Specimen used in sequence
RC16MEC0177-20170309-02	C	Pseudoscorpiones	LI31	T144224	PC058	
RC16MEC0102-170308-2	C	Schizomida	LI32	T144242	SCH001	*Paradraculoides bythius*
MEAWO4086-20170308-04	C	Thysanura	LI33	E34017	TN010	
RC16MEK002-20170321-T2-1	K	Pseudoscorpion	LI34	T144225	PC059	
RC16MEK002-20170321-T3-1	K	Pseudoscorpion	LI35	T144226	PC059	
RC16MEA004-20170322-T1-1	A	Schizomida	LI36	T144230	SCH034	
RC16MEA004-20170322-T1-2	A	Schizomida	LI37	T144232	SCH034	
RC16MEA004-20170322-T1-3	A	Schizomida	LI38	T144231	SCH034	
RC16MEA004-20170322-T1-4	A	Schizomida	LI39	T144233	SCH036	*Paradraculides anachoretus*
142611	A	Schizomida	LI40	T142611	SCH036	*Paradraculides anachoretus*
142610	A	Schizomida	LI41	T142610	SCH036	*Paradraculides anachoretus*
142613	A	Schizomida	LI42	T142613	SCH036	*Paradraculides anachoretus*
142612	A	Schizomida	LI43	T142612	SCH034	
MEBRC0008	B	Coleoptera	LI44		CCU012	
MEBRC0016	B	Coleoptera	LI45		CCU012	

Helix
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6 July, 2017

Jason Alexander
Biota Environmental Sciences
Level 1, 228 Carr Place
Leederville, WA 6007

Via email

Re. Report on the molecular systematics of troglofauna from Warramboo, and Mesas A, C and K (Biota 1080c)

Dear Jason,

Following is a summary of the results of the troglofauna study we have completed for six taxonomic groups (Araneae, Coleoptera, Diplura, Pseudoscorpiones, Schizomida, Thysanura) from Mesas A, C, K and Warramboo. Nine distinct genetic lineages were detected in the collections, five of which have been detected previously in the Pilbara.

Thanks once again for collaborating on this project with Helix. We hope we can continue to provide you with useful information, and feel free to contact us if you have any questions or would like to discuss the results in detail.

Sincerely,

Dr. Terrie Finston, Yvette Hitchen and Dr. Oliver Berry
Helix Molecular Solutions

Background and Objective

Seventeen specimens of troglofauna from six taxonomic groups (Araneae, Coleoptera, Diplura, Pseudoscorpiones, Schizomida, Thysanura) were collected from Mesas A, C, K and Warramboo and sequenced for variation at the mitochondrial COI gene, with the exception of the Thysanura, which was sequenced for 12s. The molecular data were assessed in order to determine the number of species present and compare the results to those obtained during previous surveys in the Pilbara.

Executive summary

- Seventeen specimens of troglofauna from Mesas A, C, K and Warramboo were sequenced for variation at the COI or 12s gene.
- Nine distinct genetic lineages from were detected among the 17 specimens.
- Five of the lineages have been detected previously in the Pilbara, during previous surveys at Mesa B and C.
- Four of the lineages appear to be new, based on the material available for comparison.

Methods

Seventeen specimens of troglofauna from six taxonomic groups (Araneae, Coleoptera, Diplura, Pseudoscorpiones, Schizomida, Thysanura) were sequenced for variation at the mitochondrial cytochrome oxidase subunit I gene (COI) using primers LCOI/HCO2, with one exception. The Thysanura was sequenced for the 12s gene, using primers 12sai/12sbi (Simon et al., 1994).

Sequences were edited using GENEIOUS software (Drummond *et al.* 2011). Alignment was performed with CLUSTAL W (Thompson *et al*. 1994) using default parameters. Genetic distances between unique genetic sequences (haplotypes) were measured using uncorrected p-distances (total percentage of nucleotide differences between sequences).

MODELTEST software (Posada and Crandall, 1998) was used to determine the model of sequence evolution that best fitted the data for each taxonomic group. Bayesian analysis was used to construct the phylogenetic trees, incorporating the model as identified in MODELTEST for each taxonomic group. The phylogeny, branch lengths and posterior probabilities were obtained by running two trees simultaneously, each running four simultaneous MCMC chains. The number of cycles needed was determined by the standard deviation of the split frequencies of the two trees. The analysis was paused after every 1 x 10^6 generations and when the standard deviation fell below 0.01, the analysis was stopped. A majority rule consensus tree was constructed after discarding the "burn-in" trees in both analyses. The burn-in value was determined by plotting the posterior probabilities obtained after every generation and identifying the point at which the values reach stationarity (= the asymptote). Trees produced prior to stationarity were discarded.

For the purposes of this report, lineages were defined as haplotypes or groups of haplotypes differing from other such groups by >3% sequence divergence. This cut-off was selected based on bar-coding data, which indicates that intra-specific variation rarely exceeds 2-3% (Hebert et al., 2003b).

Results

Araneae

A single specimen of Araneae from Mesa C was sequenced for COI (Table 6). The sequence was compared to sequences of Araneae in the Helix and GenBank databases. The specimen was most similar to specimens of Gnaphosidae (85% similarity to a Genbank specimen of *Zelanda*), however a subset of reference specimens that differed by ≤15% from the Mesa B and C specimens from all phases were selected to include in the phylogenetic analysis, including 33 specimens of Araneae from the Pilbara, eight of which were collected during previous surveys at Mesas B and C, as well as eight GenBank reference specimens as follows: Gnaphosidae: *Zeland* sp. (Genbank accession # KY017738) Aranidae: *Arachnura scorpiooides*, (GenBank accession #KJ957946 and *Gea theridoides* (Genbank accession #KJ959766), Oonopidae: *Ischnothyreus auritus* (Genbank accession# KR864743) Theridiidae: *Theridion ohlerti* (Genbank accession #GU684645), *Robertus neglectus* (GenBank accession #AY231053), *Theridion boesonbergi* (Genbank accession #KX537094) and *Coleosoma acutiventer* (Genbank

accession # EF050286). Two specimens of Mygalomorphae, *Missulena* sp. WAM T97637 (Genbank accession # KC708097) and *Missulena* sp. WAM T113626 (Genbank accession # KC708079) were used as outgroups.

Phylogenetic analysis
The phylogenetic analysis, which included the new specimen from Mesa C, in addition to 41 reference specimens, placed the Mesa C specimen in a single genetically distinct lineage (Figure 4). The lineage was placed in a clade containing a Genbank reference specimen of Gnaphosidae and four specimens from Jirrpalpur, Opthalmia and Wheelarra Hill, and thus was assigned to the new lineage AG003 (Figure 4). The specimens of Araneae from previous sampling phases at Mesas B and C were placed in clades containing Theridae/Symphytognathidae, Aranidae and Oonopidae (Figure 4).

Differentiation within and between lineages
The new specimen from Mesa C (lineage AG003) differed from the reference specimens by between 15.0 and 27.7% sequence divergence (Table 7).

Coleoptera
Reference specimens and outgroups
Two specimens of Coleoptera from Mesa B were sequenced for COI (Table 6). In order to reduce analysis time and to simplify the presentation of results, a preliminary neighbour-joining (NJ) analysis was conducted on the Mesa B specimens and analysed with 123 reference sequences of Coleoptera, including 23 provided by the WAM, to identify a manageable and relevant reference data set. The specimens were most closely related to reference specimens of Curculionidae, so the final dataset consisted of a Genbank voucher sequence (Curculionidae sp. 8, Genbank accession #KU519717) and 29 reference specimens of Curculionidae from the Pilbara, including 15 sequences provided by the WAM, representing eight species and ten from previous surveys at Mesas B and C. Two specimens of Coleoptera from the family Dermestidae, *Dermestes maculatus* (Genbank accession # HM909035) and *Dermestes frischii* (Genbank accession # KM578824) were used as outgroups.

Phylogenetic analysis
The phylogenetic analysis, which included the two specimens from Mesa B, in addition to 30 reference specimens, placed the Mesa B specimens in a single lineage, which also contained five reference specimens of Curculionidae from previous surveys at Mesas B and C in the Robe Valley (Figure 5). Thus the new Mesa B specimens were assigned to the existing lineage CCU012 (Figure 5). The lineage was placed in a well-supported clade containing two WAM reference specimens of Curculionidae sp. 8 (Figure 5). The specimens of Coleoptera from previous sampling phases at Mesas B and C were all placed in the Curculionidae (Figure 5).

Differentiation within and between lineages
The two specimens of Curculionidae from Mesa B differed from one another by 0.9% sequence divergence (Table 8).

The Mesa B specimens differed from the reference specimens by between 0 and 23.0% sequence divergence (Table 8). In particular, the Mesa B specimens differed from five reference specimens from previous surveys at Mesas B and C by between 0 and 0.9% sequence divergence and from the reference specimens in clade Curculionidae sp. 8 by between 2.7 and 3.4% sequence divergence (Table 8).

Diplura
Reference specimens and outgroups
One specimen of Diplura from Mesa C was sequenced for COI (Table 6). Comparisons to Genbank and Helix databases showed that the specimen was most closely related to the family Japygidae, however, the specimen was analysed with 36 specimens of Diplura from the Pilbara belonging to three families, in order to include specimens from previous surveys at Mesas B and C: Campodeidae, Japygidae, and Parajapygidae, as well as five Genbank voucher specimens, Diplura sp., which is most similar to Genbank specimens of Campodeidae (Genbank accession #HQ943342), *Campodea tillyardi* (Genbank accession # AF370844) and *Lepiodocampa weberi* (Genbank accession #HQ882832) from the family Campodeidae,

Parajapyx pauliani (Genbank accession #JQ692327) from the family Parajapygidae and *Japyx solifugus* (Genbank accession #AY771989) from the family Japygidae. The planthopper *Lycorma delicatula* (Genbank accession # FJ456942) and a specimen of Fulgoridae (Hemiptera sp.; Genbank accession #GU671563) were used as outgroups.

Phylogenetic analysis
The phylogenetic analysis, which included the new specimen of Diplura from Mesa C, in addition to 36 reference specimens, placed the Mesa C specimen in a distinct genetic lineage that did not contain any reference specimens (Figure 6). The specimen was placed in a clade containing lineages of Japygidae, and was assigned to the new lineage DJA011 (Figure 6). The specimens of Diplura from previous sampling phases at Mesas B and C were placed in the Parajapygidae and Campodeidae (Figure 6).

Differentiation within and between lineages
The specimen of Japygidae from Mesa C differed from the nearest reference specimen (JU01) by 15.0% sequence divergence (Table 9).

Thysanura
Reference specimens and outgroups
One specimen of Thysanura from Mesa C was sequenced for 12s (Table 6). A search of similar sequences on Genbank and in the Helix database indicated that the specimen most closely matched database specimens of the subfamily Nicoletiinae. Based on those results, GenBank voucher sequences were included as reference sequences of Nicoletiinae (two specimens) as follows: *Trinemura callawa* and *T. cundalin* (GenBank accession #JQ282164 and JQ282165). In addition, as local references, 33 specimens of Nicoletiinae, including five from previous surveys at Mesa B/C, were included in the analysis. A specimen of Atelurinae was used as an outgroup: *Atelura formicaria* (Genbank accession # EU084035).

Phylogenetic analyses
The phylogenetic analysis, which included the new specimen from Mesa C, in addition to 35 reference specimens, placed the Mesa C specimen in a single distinct genetic lineage, which also contained two reference specimens from a previous survey at Mesa B/C, thus was assigned to the existing lineage TN010 (Figure 7). The specimens of Thysanura from previous sampling phases at Mesas B and C were all placed in the subfamily Nicoletiinae (Figure 7).

Differentiation within and between lineages
The lineage of Nicoletiinae differed from nearest reference specimens IV333 and IV227 by 0.5 and 2.8% sequence divergence, respectively and from the remaining reference specimens by >9% (Table 10).

Pseudoscorpions

Reference sequences and outgroups
Three pseudoscorpions were sequenced from Mesa C and K (Table 6). A search of similar sequences on Genbank and in the Helix database indicated that all of the specimens most closely matched the family Chthoniidae. Based on those results, a reference dataset of 81 Genbank and Pilbara specimens was reduced to a more manageable and relevant dataset by selecting only the 41 reference specimens that occurred in the same clades as the Mesa C and K specimens, based on a preliminary neighbour joining analysis. Two Genbank voucher sequences of Chthoniidae were included in the analysis as follows: *Paraliochthonius* sp JM 2008 (Genbank accession #EU5595505) and *Tyrannochthonius aridus* (GenBank accession # KJ659959 from Western Australia). In addition, as local references, 39 specimens of Chthoniidae from previous surveys in the Pilbara, were included in the analysis, including 16 from previous surveys at Mesas B and C. Sequences of the scorpion *Pandinus imperator* (Genbank accession # AY1565821) and harvestman spider *Siro rubens* (Genbank accession # DQ5131111) were used as outgroups.

Phylogenetic analysis
The phylogenetic analysis of the Chthoniidae, which included the three Chthoniidae specimens from Mesa C and K, in addition to 41 reference specimens, placed the Mesa C and K specimens in two distinct genetic lineages (Figure 8). Neither lineage contained reference

specimens and the two were therefore assigned to the new lineages PC058 and PC059 (Figure 8). However the lineages showed significant although distant relationships with some reference specimens (Figure 8). Specifically, specimen LI31/lineage PC058 formed a well-supported clade with specimens of lineage PC047 (IV261, KD66, KD67 and KD69) from Mesas B and C (Figure 10). Similarly, specimens LI34 and LI35/lineage PC059 formed well-supported clades with specimens IV212/IV226 and IV269, respectively, from previous surveys in the Robe Valley (Figure 8). The specimens of Pseudoscorpiones from previous sampling phases at Mesas B and C were placed in the Chthoniidae (Figure 8) and the Hyiidae (not shown).

Differentiation within and between lineages

The three specimens of Chthoniidae from Mesa C and K differed from one another by between 0.0 and 20.2% sequence divergence and from the reference lineages by > 6.0% sequence divergence (Table 11). Specifically, specimen LI31 (lineage PC058) differed from the nearest reference specimens, IV261, KD66, KD67 and KD69 (lineage PC057) by between 6.1 and 6.3% sequence divergence (Table 11). Specimens LI34 and LI35 (lineage PC059) differed from the nearest reference specimens, IV212, IV226 and KD24 (lineages PC009, PC010 and PC053, respectively) by between 7.6 and 10.2% sequence divergence (Table 11).

Schizomids

Preliminary analysis - Reference sequences and outgroups

Eleven schizomids were sequenced from Mesas A and C (Table 6). In order to assemble a relevant reference data set, a preliminary neighbour-joining (NJ) analysis was conducted on the 11 Mesa A and C specimens, to identify the number of genetic lineages present. A representative from each was compared to Helix and Genbank sequence databases, representing >500 reference sequences of schizomids from previous surveys in the Pilbara. The reference sequences were selected based on the criteria that they showed ≤ 15% sequence divergence from at least one of Mesa A and C lineages.

Three distinct genetic lineages were detected and the number of individuals within each lineage ranged from one to four (Figure 9). All three showed the highest genetic similarity to reference specimens of *Paradraculoides*. A representative from each was analysed in a model-based phylogenetic analysis with 27 reference specimens of *Paradraculoides*, including five Genbank voucher specimens of *Paradraculoides*: *P. anachoretus* (GenBank accession # EU272701), *P. bythius* (GenBank accession # EU272715), *P. gnophicola* (GenBank accession # EU272716) *P. kryptus* (GenBank accession # EU272723), and *Paradraculoides* sp (GenBank accession # EU272697). As local references, 22 specimens from previous surveys in the Pilbara were included in the analysis, including 11 from previous surveys at Mesas B and C. Two specimens of *Draculoides*, *D. julianeae* (GenBank accession # EU272696) and *D. vinei* (GenBank accession # EU272690) were used as outgroups.

Phylogenetic analysis

The phylogenetic analysis, which included the three Mesa A and C specimens, in addition to 27 reference specimens of *Paradraculoides*, placed the Mesa A and C specimens in three distinct lineages, all three of which (SCH001 (*P. bythius)*, SCH034 and SCH036 (*P. anachoretus*) also contained reference specimens from previous surveys at Mesa B and C (Figure 10). Lineages SCH034 and SCH036 formed a well-supported clade, with the lineages separated by relatively short branch lengths (Figure 10). The specimens of Schizomida from previous sampling phases at Mesas B and C were placed in the genus *Paradraculoides* (Figure 10) and a new genus, perhaps closely related to *Bamazomus* (not shown).

Differentiation within and between lineages

The three lineages of *Paradraculoides* detected at Mesa A and C differed from one another by between 5.6 and 9.4% mean sequence divergence (Table 12). Individuals within each of the three lineages differed from one another by 0.1% mean sequence divergence (Table 13).

The three lineages (SCH001, SCH034 and SCH036) differed from the closest reference lineages by ≤1% sequence divergence (Table 14).

Conclusions

COI is widely considered to show suitable variation to distinguish species (Hebert et al., 2003a). In a comparison of COI sequences for over 13,000 pairs of taxa, Hebert et al (2003b) found a mean of 11.1% sequence divergence between distinct species. Nearly 80% of the comparisons showed that species pairs differed from one another by greater than 8% sequence divergence. However, a taxon by taxon approach, examining the amount of phylogenetic variation within and between species is the most widely accepted method of defining species.

Araneae

A single genetically distinct lineage of Araneae was detected at Mesa C (AG003), representing a single distinct species, owing to the high level of sequence divergence between it and the reference lineages. The lineage differed from the reference lineages by >15%, indicating that it is likely to be a new species, based on the material available for comparison. The species is likely to belong to the family Gnaphosidae (ground spiders), based on its phylogenetic placement and similarity to a reference specimen of *Zelanda* from New Zealand. The family is widespread in Australia, and two troglobitic species are known from Barrow Island (Humphreys et al., 2013). Previous specimens of Araneae collected at Mesa B/C were putatively assigned to the families Theridae/Symphytognathidae, Aranidae and Oonopidae.

Gnaphosidae (putative)
AG001 = new lineage and species

Coleoptera

A single genetic lineage of Coleoptera was detected at Mesa B. The lineage differed from specimens of the nearest reference lineage CCU012 by < 1%, indicating that the specimen represents a lineage and species of Curculionidae that has been detected previously.
The Mesa B specimen was placed in a clade containing reference specimens from the WAM, assigned to the species Curculionidae sp. 8. Differentiation within the clade ranged from 2.7-3.3% sequence divergence, suggesting that the species from Mesa C belongs to Curculionidae sp. 8. For comparison, differentiation within the four WAM species for which there are multiple sequences (species 1, 3, 4, 8) ranges from a mean of 0.1% (species 1) to 5.2% (species 4). Previous specimens of Coleoptera collected at Mesa B/C were also assigned to the family Curculionidae.

Curculionidae
CCU012 = lineage and species detected previously at Mesas B and C in the Robe Valley

Diplura

A single distinct genetic lineage of Diplura was detected at Mesa C. The lineage was placed with the Japygidae (lineage DJA011). The lineage differed from the reference lineages by >15% sequence divergence, indicating that it is likely to represent a new species, which has so far not been detected in the Pilbara, based on the material available for comparison. Previous specimens of Diplura collected at Mesa B/C were putatively assigned to the families Parajapygidae and Campodeidae.

Japygidae
DJA011 = new lineage and species

Thysanura

The mitochondrial gene 12S is widely used in insect systematics (Simon et al., 1996; Caterino et al., 2000), although in contrast to the mitochondrial gene COI, fewer broadscale comparative studies are available to provide a basis for species discrimination. Nonetheless, 12S has proven useful for establishing phylogenetic relationships in many insect groups (Caterino et al., 2000). The 12S gene evolves approximately 1.5 times (Mueller, 2006) more slowly than COI. Hence we would expect that the threshold for species discrimination using 12S would be, by inference, lower than COI.

A single distinct lineage of Thysanura was detected at Mesa C, Nicoletiinae TN010. It differed from the nearest reference specimens by between 0.5 and 2.8% sequence divergence.

Using a conversion factor of 1.5 x to account for the slower 12s rate of evolution, this value might correspond to approximately 0.8 to 4.2% of COI divergence. For comparison, the six specimens of *Trimenura callawa* differ by a mean of 0.4% sequence divergence (range = 0 to -0.9% at 12s may correspond to up to approximately 1.4% at COI). Given the relatively low value between specimens of TN010, but keeping in mind that these are estimates based on current understanding of 12s and COI evolution rates, it is likely that lineage TN010 represents a single species, showing some genetic divergence among drillholes. Previous specimens of Thysanura collected at Mesa B/C were also assigned to the sub-family Nicoletiinae.

Nicoletiinae
TN010 = lineage and species that has been detected previously at Mesa B/C.

Pseudoscorpiones

Two distinct genetic lineages of pseudoscorpions were detected at Mesa C and K, both likely belonging to the family Chthoniidae. The two lineages of Chthoniidae differed from one another by approximately 20% sequence divergence, thus each is likely to represent a distinct species. Further, both Chthoniidae lineages from Mesa C and K differed from the nearest reference specimens by ≥6%, indicating that the two are likely to be new species that have so far not been detected in the Pilbara, based on the material available for comparison. Previous specimens of Pseudoscorpiones collected at Mesa B/C were assigned to the families Chthoniidae and Hyiidae.

Chthoniidae
PC058 = new lineage, new species
PC059 = new lineage, new species

Schizomida
Previous analyses of genetic variation between morphologically distinct species of Schizomida can be used as a genetic 'yardstick' to interpret the current data set. The five described species of *Paradraculoides* (Harvey et al, 2008) differ from one another by between 8.4 to 12.1% sequence divergence (uncorrected p-distances; calculated by us from the Harvey et al., 2008 data). Similarly, the four described species of *Draculoides* differ from one another by between 4.5 to 13.7% sequence divergence (uncorrected p-distances calculated by us from Harvey et al., 2008).

Three genetically distinct lineages of schizomids were detected at Mesa A and C. The three lineages correspond to three species, all of which were assigned to existing lineages and species. Specifically, one specimen was assigned to *Paradraculoides bythius* (lineage SCH001) and four specimens were assigned to *Paradraculoides anachoretus* (lineage SCH036), differing from these reference lineages by <3%. Finally, x specimens were assigned to the existing lineage SCH034, as it differed from the reference specimens of that lineage by >1%. Lineages SCH034 and SCH036 formed a well-supported clade and differed by a moderately low level of sequence divergence (5.6 to 6.3% sequence divergence). This variation is greater than would be expected within a single species, and given that both lineages were detected in the same drillhole (RC16MEA004), indicates that that the two lineages are reproductively isolated. Previous specimens of Schizomida collected at Mesa B/C were assigned to the genus *Paradraculoides* and a new genus, putatively related to *Bamzomus*.

Paradracucloides
SCH001 = previously detected lineage and species (*Paradraculoides bythius*)
SCH034 = previously detected lineage and species
SCH036 = previously detected lineage and species (*Paradraculoides anachoretus*)

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Simon C, Frati F, Beckenbach AT, Crespi B, Liu H, et al. (1994) Evolution, weighting, and phylogenetic utility of mitochondrial gene sequences and a compilation of conserved polymerase chain reaction primers. Ann Entomol Soc Am 87: 651-701.

Thompson, J., Higgins, D., and Gibson, T. (1994). CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. Nucleic Acids Research 22: 4673–4680. doi:10.1093/nar/ 22.22.4673

Table 6. Specimens of Troglofauna used in the present study and the lineage to which they were assigned, based on variation at the COI or 12s genes. *=new lineage this study.

Tracking Number	Mesa	Taxonomy	Cap #	Helix ID	Lineage
RC16MEC0177-20170309-01	C	Araneae	21	LI29	AG001*
MEAWO4088-20170307-01	C	Diplura	1	LI30	DJA011*
RC16MEC0177-20170309-02	C	Pseudoscorpiones	22	LI31	PC058*
RC16MEC0102-170308-2	C	Schizomida	11	LI32	SCH001 (P. bythius)
MEAWO4086-20170308-04	C	Thysanura	14	LI33	TN010
RC16MEK0002-20170321-T2-1	K	Pseudoscorpiones	1	LI34	PC059*
RC16MEK0002-20170321-T3-1	K	Pseudoscorpiones	2	LI35	PC059*
RC16MEA004-20170322-T1-1	A	Schizomida	4	LI36	SCH034
RC16MEA004-20170322-T1-2	A	Schizomida	5	LI37	SCH034
RC16MEA004-20170322-T1-3	A	Schizomida	6	LI38	SCH034
RC16MEA004-20170322-T1-4	A	Schizomida	7	LI39	SCH036 (P. anachoretus)
MOB3a	A	Schizomida		LI40	SCH036 (P. anachoretus)
MOB3b	A	Schizomida		LI41	SCH036 (P. anachoretus)
MOB3b	A	Schizomida		LI42	SCH036 (P. anachoretus)
RC16MEA004	A	Schizomida		LI43	SCH034
MEBRC0008	B	Coleoptera		LI44	CCU012
MEBRC0016	B	Coleoptera		LI45	CCU012

Table 7 (attached). COI genetic distances (below diagonal) and standard error (above diagonal, in blue) between specimens of Araneae detected at Mesa C and the reference lineages as shown in Figure 4. Distances between the Mesa C specimen and the reference specimens are highlighted in yellow.

Table 8 (attached). COI genetic distances (below diagonal) and standard error (above diagonal, in blue) between specimens of Coleoptera detected at Mesa B and the reference lineages as shown in Figure 5. Distances between the Mesa C specimens and the reference specimens are highlighted in yellow.

Table 9 (attached). COI genetic distances (below diagonal) and standard error (above diagonal, in blue) between specimens of Diplura detected at Mesa C and the reference lineages as shown in Figure 6. Distances between the Mesa C specimen and the reference specimens are highlighted in yellow.

Table 10 (attached). 12s genetic distances (below diagonal) and standard error (above diagonal, in blue) between specimens of Thysanura detected at Mesa C and the reference lineages as shown in Figure 7. Distances between the Mesa C specimen and the reference specimens are highlighted in yellow.

Table 11 (attached). COI genetic distances (below diagonal) and standard error (above diagonal, in blue) between specimens of Pseudoscorpiones detected at Mesa C and K and the reference lineages as shown in Figure 8. Distances between the Mesa C specimen and the reference specimens are highlighted in yellow.

Table 12. Mean genetic distance (p-distances, below diagonal) and standard error (blue, above diagonal) between lineages of Schizomida at COI as shown in Figure 9.

Lineage	**1**	**2**	**3**
1		0.009	0.012
2	0.058		0.011
3	0.085	0.094	

Table 13. Mean genetic distance (p-distances) and standard errors within lineages of Schizomida at COI as shown in Figure 9. N= number of specimens in the lineage and rep= specimen selected to represent the lineage in the model-based phylogenetic analysis.

Lineage	**D**	**s.e.**	**N**	**rep**
1	0.001	0.001	4	LI38
2	0.001	0.001	4	LI39
3	n/c	n/c	1	LI32

Table 14 (attached). COI genetic distances (below diagonal) and standard error (above diagonal, in blue) between specimens of Schizomida detected at Mesa A and C and the reference lineages as shown in Figure 10. Distances between the Mesa A and C specimens and the reference specimens are highlighted in yellow.

Figure 4. Bayesian analysis of COI haplotypes of Araneae from the present study and reference specimens from Genbank and previous surveys in the Pilbara. Numbers on major nodes correspond to posterior probabilities; values <50% are not shown. Specimens from the present study are highlighted in yellow; specimens from previous phases at Mesa B/C are highlighted in green; GenBank voucher specimens highlighted in turquoise. Scale bar= number of substitutions per site.

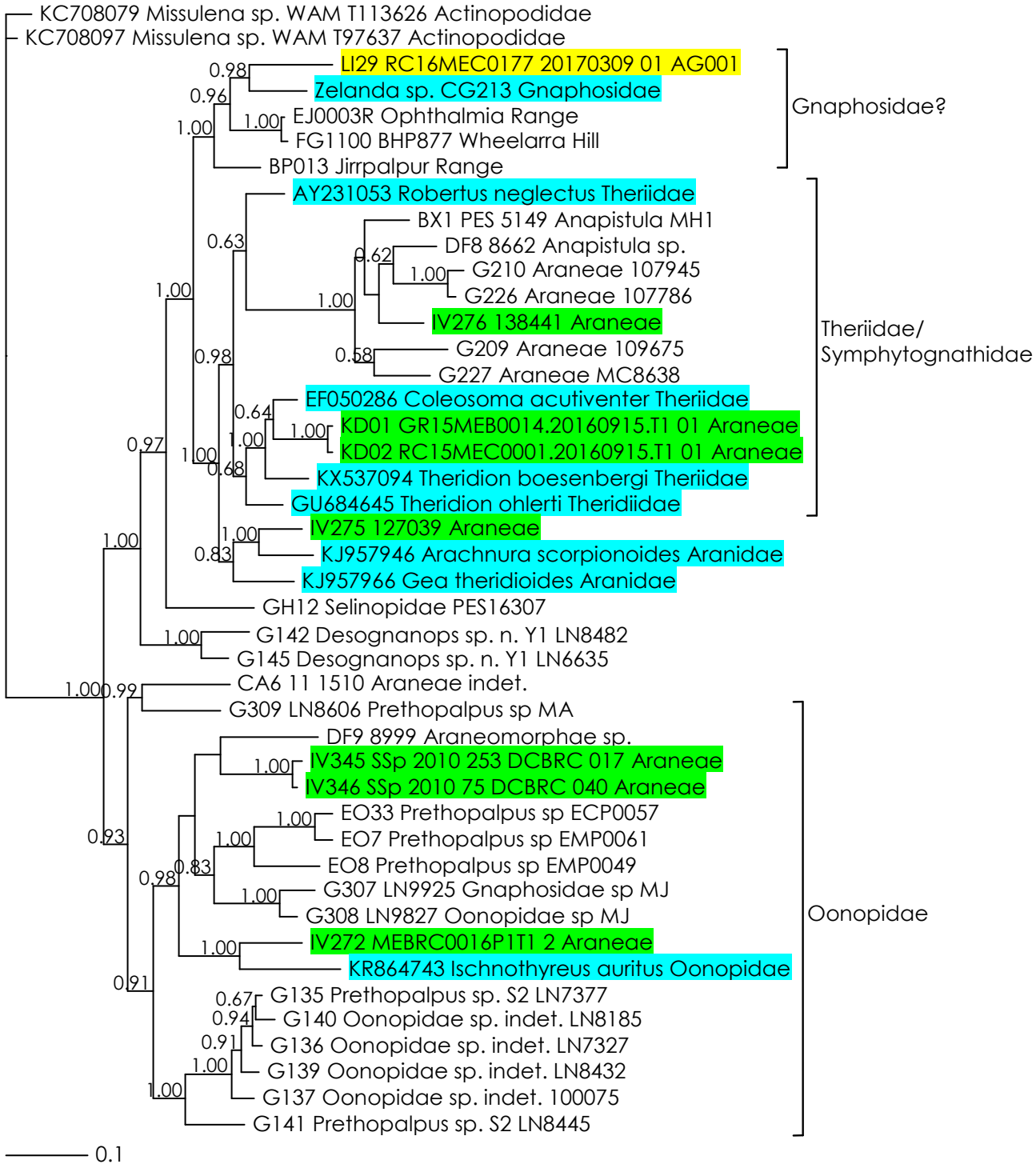

Figure 5. Bayesian analysis of COI haplotypes of Coleoptera from the present study and reference specimens from Genbank and previous surveys in the Pilbara. Numbers on major nodes correspond to posterior probabilities; values <50% are not shown. Specimens from the present study are highlighted in yellow; specimens from previous phases at Mesa B/C are highlighted in green; GenBank voucher specimens highlighted in turquoise. Scale bar= number of substitutions per site. Red boxes enclose species defined with high confidence.

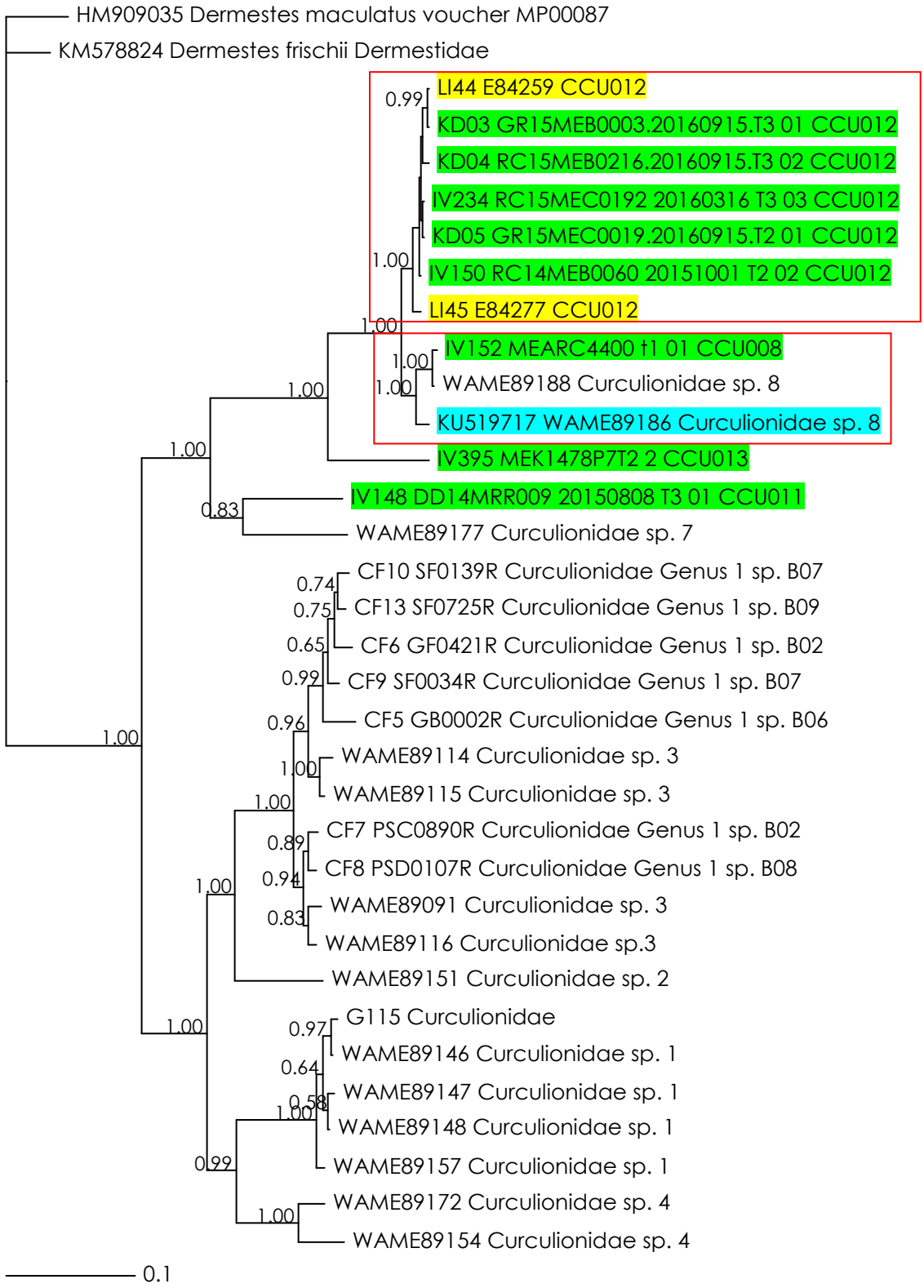

Figure 6. Bayesian analysis of COI haplotypes of Diplura from the present study. Numbers on major nodes correspond to posterior probabilities; values <50% are not shown. Specimens from the present study are highlighted in yellow; specimens from previous phases at Mesa B/C are highlighted in green; GenBank voucher specimens highlighted in turquoise. Scale bar= number of substitutions per site.

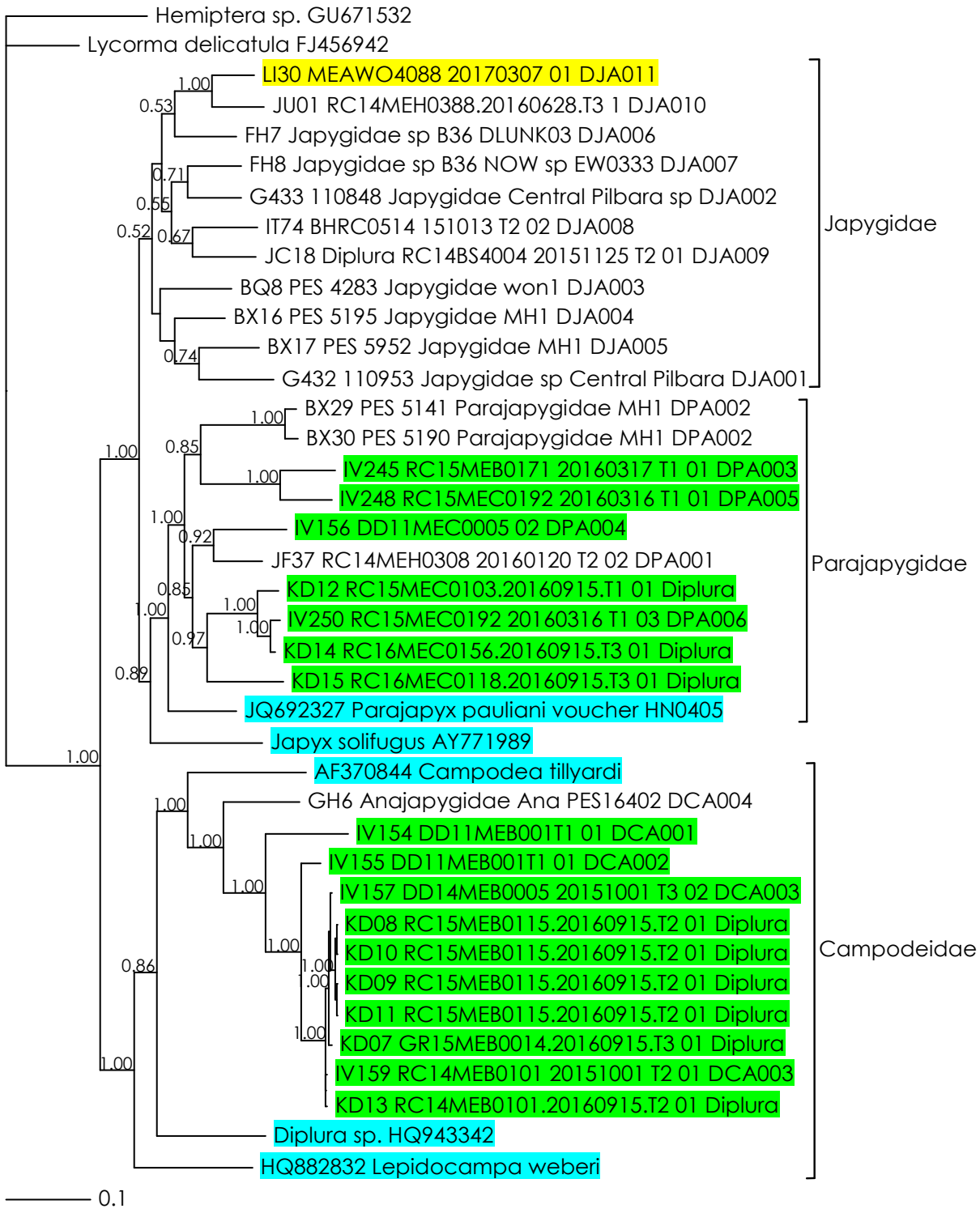

Figure 7. Bayesian analysis of 12s haplotypes of Thysanura from the present study and reference specimens from Genbank and previous surveys in the Pilbara. Numbers on major nodes correspond to posterior probabilities; values <50% are not shown. Specimens from the present study are highlighted in yellow; specimens from previous phases at Mesa B/C are highlighted in green; GenBank voucher specimens highlighted in turquoise. Scale bar= number of substitutions per site. Red boxes enclose species defined with high confidence.

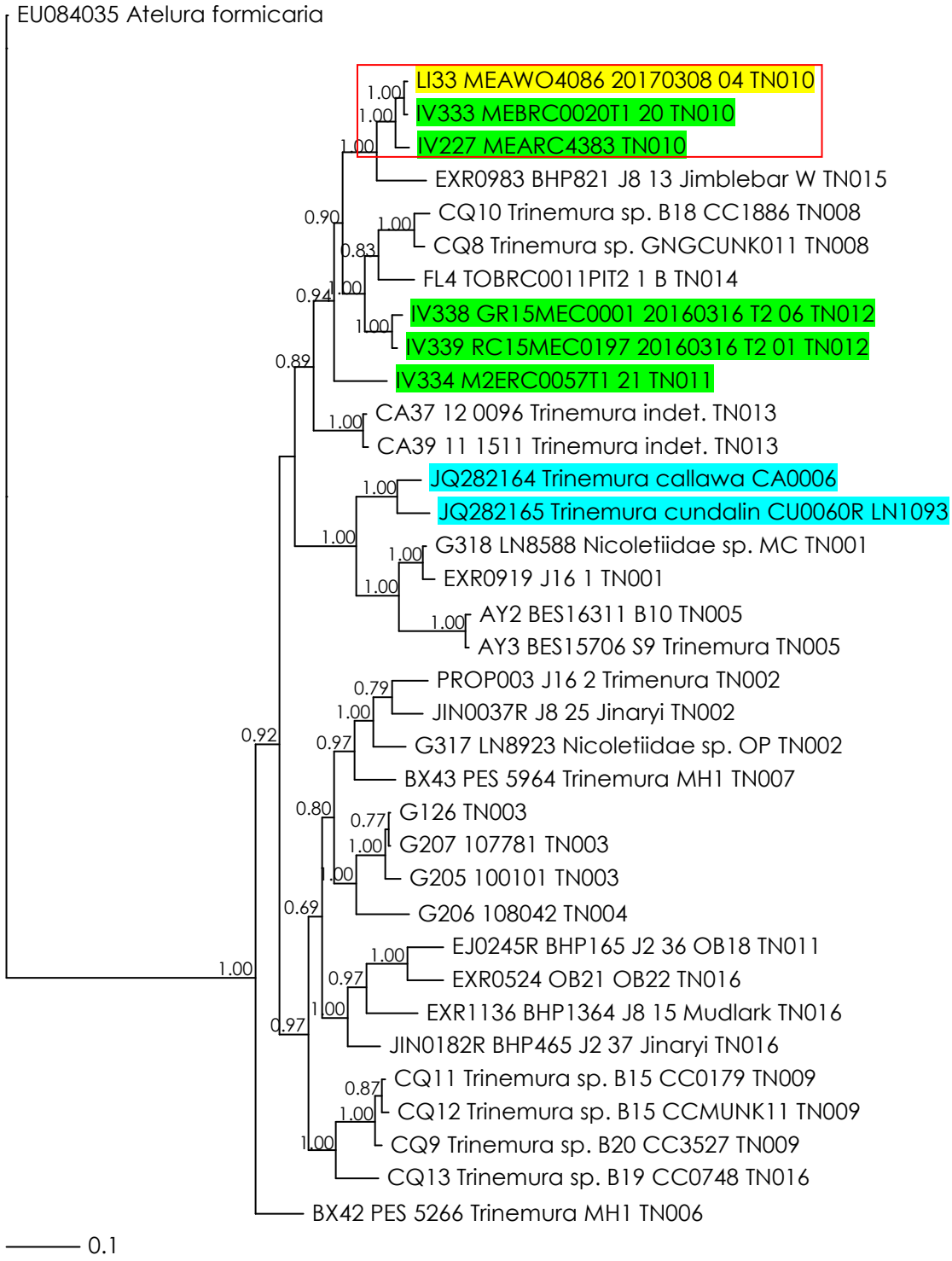

Figure 8. Bayesian analysis of COI haplotypes of Pseudoscorpiones from the present study and reference specimens from Genbank and previous surveys in the Pilbara. Numbers on major nodes correspond to posterior probabilities; values <50% are not shown. Specimens from the present study are highlighted in yellow; specimens from previous phases at Mesa B/C are highlighted in green; GenBank voucher specimens highlighted in turquoise. Scale bar= number of substitutions per site.

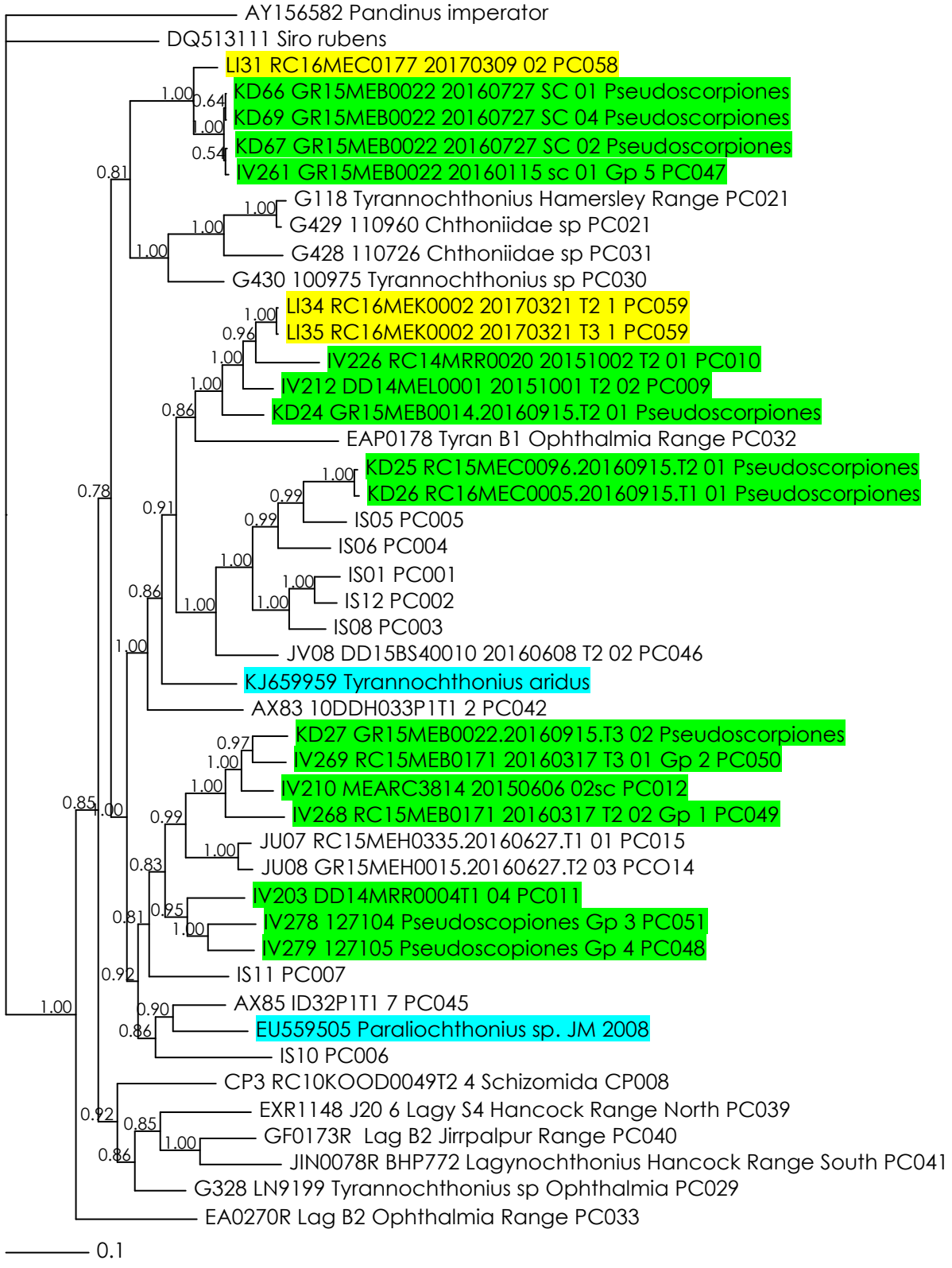

Figure 9. Neighbour-joining analysis of COI haplotypes of Schizomida from the present study. Numbers on major nodes correspond to bootstrap support over 100 iterations; values <50% are not shown. Scale bar= genetic distance. The specimens used to represent each lineage in the model-based phylogenetic analysis are highlighted in yellow.

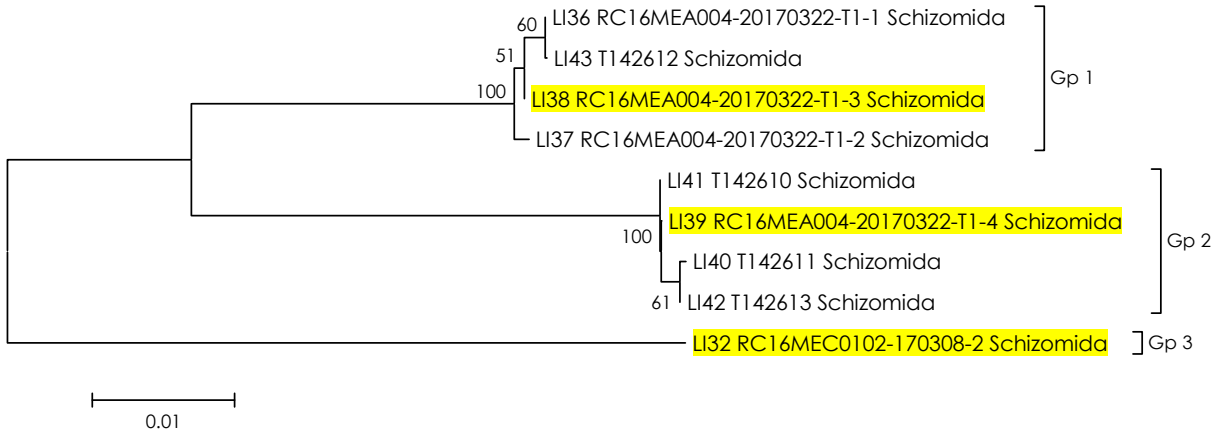

Figure 10. Bayesian analysis of COI haplotypes of Schizomida from the present study and reference specimens from Genbank and previous surveys in the Pilbara. Numbers on major nodes correspond to posterior probabilities; values <50% are not shown. Specimens from the present study are highlighted in yellow; specimens from previous phases at Mesa B/C are highlighted in green; GenBank voucher specimens highlighted in turquoise. Scale bar= number of substitutions per site. Red boxes enclose species defined with high confidence.

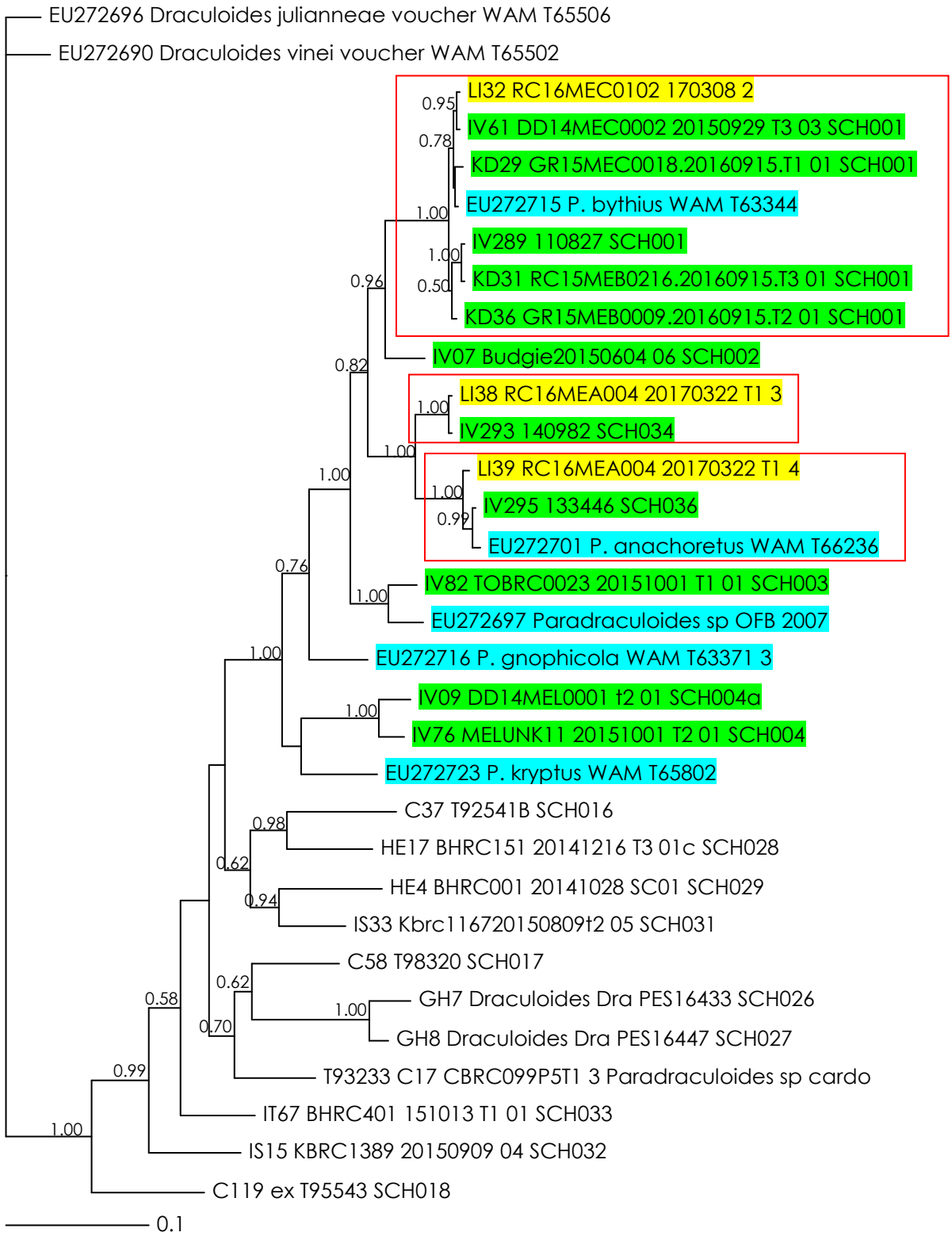

Table 7. Estimates of Evolutionary Divergence between Sequences

Specimen ID	LI29 RC16MEC0177-20170309-01	AY231053 Robertus neglectus Theriidae	BP013 Deposit B	BX1 PES-5149 Anapistula MH1	CA6 11:1510 indet.	DF8 8662 Anapistula sp.	DF9 8999 Araneomorphae sp.	EF050286 Coleosoma acutiventer Theriidae	EJ0003R OB18	EO33 Prethopalpus sp ECP0057	EO7 Prethopalpus sp EMP0061	EO8 Prethopalpus sp EMP0049	FG1100 BHP877 Jimblebar	G135 Prethopalpus sp. S2 LN7377	G136 Oonopidae sp. indet. LN7327	G137 Oonopidae sp. indet. 100075	G139 Oonopidae sp. indet. LN8432	G140 Oonopidae sp. indet. LN8185	G141 Prethopalpus sp. S2 LN8445	G142 Desognanops sp. n. Y1 LN8482	G145 Desognanops sp. n. Y1 LN6635	G209 109675	G210 107945	G226 107786	G227 MC8638	G307 LN9925 Gnaphosidae sp MJ	G308 LN9827 Oonopidae sp MJ	G309 LN8606 Prethopalpus sp MA	GH12 Selinopidae PES16307	GU684645 Theridion ohlerti Theridiidae	IV272 MEBRC0016P1T1-2	IV275 127039	IV276 138441	IV345 SSp-2010-253 DCBRC 017	IV346 SSp-2010-75 DCBRC 040	KD01 GR15MEB0014.20160915.T1-01	KD02 RC15MEC0001.20160915.T1-01	KJ957946 Arachnura scorpionoides Aranidae	KJ957966 Gea theridioides Aranidae	KR864743 Ischnothyreus auritus Oonopidae	KX537094 Theridion boesenbergi Theriidae	Zelanda sp. CG213 isolate ARACG000213
LI29 RC16MEC0177-20170309-01		0.018	0.017	0.019	0.019	0.021	0.020	0.019	0.018	0.024	0.025	0.022	0.018	0.021	0.021	0.019	0.021	0.021	0.019	0.019	0.020	0.020	0.021	0.021	0.019	0.019	0.021	0.018	0.021	0.020	0.021	0.019	0.021	0.020	0.020	0.019	0.019	0.020	0.019	0.021	0.020	0.017
AY231053 Robertus neglectus Theriidae	0.185		0.016	0.019	0.018	0.022	0.019	0.015	0.017	0.026	0.026	0.022	0.017	0.021	0.021	0.020	0.021	0.021	0.020	0.017	0.018	0.023	0.022	0.021	0.020	0.022	0.021	0.021	0.018	0.015	0.019	0.015	0.021	0.020	0.021	0.018	0.017	0.014	0.014	0.020	0.016	0.019
BP013 Deposit B	0.150	0.152		0.020	0.017	0.021	0.020	0.015	0.015	0.024	0.024	0.023	0.016	0.020	0.020	0.020	0.021	0.020	0.019	0.018	0.017	0.021	0.020	0.021	0.020	0.021	0.021	0.017	0.018	0.017	0.021	0.018	0.023	0.021	0.020	0.018	0.018	0.018	0.017	0.020	0.017	0.016
BX1 PES-5149 Anapistula MH1	0.246	0.190	0.224		0.022	0.014	0.023	0.019	0.020	0.025	0.027	0.021	0.020	0.022	0.022	0.022	0.022	0.022	0.022	0.019	0.019	0.015	0.015	0.015	0.015	0.022	0.022	0.024	0.020	0.018	0.022	0.019	0.014	0.021	0.021	0.019	0.018	0.020	0.021	0.020	0.019	0.022
CA6 11:1510 indet.	0.222	0.199	0.207	0.246		0.021	0.019	0.018	0.019	0.021	0.022	0.020	0.019	0.020	0.019	0.018	0.019	0.020	0.017	0.017	0.016	0.022	0.019	0.020	0.021	0.019	0.019	0.018	0.019	0.018	0.020	0.019	0.022	0.018	0.020	0.019	0.018	0.019	0.018	0.018	0.018	0.018
DF8 8662 Anapistula sp.	0.231	0.210	0.230	0.112	0.235		0.022	0.020	0.021	0.023	0.025	0.021	0.021	0.022	0.021	0.022	0.021	0.022	0.022	0.021	0.021	0.014	0.015	0.014	0.014	0.021	0.022	0.023	0.021	0.020	0.022	0.021	0.016	0.021	0.021	0.019	0.019	0.021	0.022	0.019	0.021	0.022
DF9 8999 Araneomorphae sp.	0.239	0.213	0.236	0.279	0.220	0.273		0.021	0.019	0.023	0.024	0.022	0.019	0.019	0.019	0.019	0.019	0.019	0.018	0.019	0.020	0.021	0.023	0.023	0.022	0.020	0.019	0.018	0.018	0.021	0.018	0.021	0.024	0.016	0.016	0.019	0.020	0.021	0.019	0.018	0.019	0.019
EF050286 Coleosoma acutiventer Theriidae	0.193	0.104	0.160	0.203	0.179	0.198	0.241		0.018	0.026	0.026	0.023	0.018	0.020	0.020	0.019	0.020	0.021	0.019	0.017	0.016	0.019	0.019	0.019	0.019	0.019	0.018	0.020	0.017	0.014	0.021	0.015	0.021	0.020	0.020	0.013	0.013	0.018	0.015	0.019	0.014	0.017
EJ0003R OB18	0.159	0.173	0.119	0.227	0.224	0.215	0.228	0.166		0.023	0.024	0.019	0.005	0.019	0.019	0.019	0.020	0.019	0.019	0.018	0.016	0.021	0.020	0.021	0.020	0.020	0.019	0.020	0.019	0.017	0.019	0.018	0.023	0.019	0.018	0.018	0.019	0.019	0.018	0.018	0.020	0.015
EO33 Prethopalpus sp ECP0057	0.276	0.284	0.284	0.270	0.222	0.250	0.207	0.276	0.259		0.010	0.019	0.023	0.020	0.020	0.020	0.020	0.020	0.020	0.022	0.021	0.023	0.021	0.021	0.024	0.021	0.020	0.021	0.025	0.026	0.023	0.025	0.023	0.019	0.019	0.025	0.024	0.026	0.025	0.020	0.025	0.023
EO7 Prethopalpus sp EMP0061	0.282	0.285	0.300	0.272	0.214	0.263	0.198	0.279	0.257	0.038		0.022	0.024	0.023	0.024	0.021	0.022	0.022	0.023	0.024	0.023	0.025	0.023	0.024	0.025	0.020	0.019	0.024	0.027	0.026	0.024	0.025	0.025	0.021	0.022	0.026	0.025	0.026	0.026	0.021	0.026	0.024
EO8 Prethopalpus sp EMP0049	0.260	0.258	0.260	0.247	0.217	0.245	0.187	0.263	0.245	0.145	0.149		0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.021	0.021	0.021	0.022	0.022	0.022	0.019	0.022	0.021	0.018	0.018	0.022	0.023	0.024	0.022	0.021	0.022	0.021
FG1100 BHP877 Jimblebar	0.165	0.177	0.130	0.233	0.230	0.223	0.227	0.169	0.008	0.259	0.257	0.245		0.019	0.018	0.020	0.020	0.019	0.019	0.017	0.016	0.021	0.020	0.021	0.020	0.019	0.019	0.020	0.019	0.018	0.019	0.019	0.022	0.018	0.018	0.018	0.019	0.019	0.019	0.018	0.021	0.015
G135 Prethopalpus sp. S2 LN7377	0.244	0.221	0.226	0.245	0.183	0.252	0.186	0.213	0.221	0.185	0.201	0.189	0.219		0.005	0.010	0.009	0.008	0.017	0.018	0.017	0.020	0.021	0.022	0.020	0.018	0.019	0.020	0.019	0.021	0.017	0.022	0.023	0.019	0.019	0.021	0.021	0.019	0.019	0.017	0.022	0.019
G136 Oonopidae sp. indet. LN7327	0.253	0.226	0.235	0.252	0.185	0.254	0.186	0.215	0.221	0.179	0.201	0.194	0.219	0.019		0.010	0.010	0.008	0.016	0.017	0.017	0.020	0.021	0.021	0.020	0.019	0.018	0.020	0.019	0.021	0.017	0.021	0.022	0.019	0.018	0.021	0.021	0.019	0.019	0.018	0.022	0.019
G137 Oonopidae sp. indet. 100075	0.244	0.226	0.235	0.254	0.180	0.257	0.191	0.206	0.215	0.182	0.201	0.207	0.212	0.055	0.057		0.010	0.010	0.015	0.017	0.017	0.021	0.021	0.021	0.020	0.018	0.018	0.019	0.019	0.021	0.016	0.020	0.022	0.018	0.017	0.019	0.019	0.020	0.018	0.017	0.021	0.018
G139 Oonopidae sp. indet. LN8432	0.253	0.223	0.241	0.263	0.178	0.254	0.195	0.213	0.226	0.190	0.211	0.199	0.223	0.040	0.043	0.053		0.009	0.016	0.017	0.019	0.020	0.022	0.022	0.021	0.017	0.018	0.020	0.021	0.022	0.019	0.021	0.024	0.021	0.020	0.020	0.021	0.021	0.021	0.019	0.020	0.023	0.019
G140 Oonopidae sp. indet. LN8185	0.236	0.223	0.230	0.249	0.169	0.252	0.175	0.215	0.210	0.188	0.192	0.189	0.208	0.030	0.036	0.060	0.049		0.016	0.017	0.018	0.019	0.021	0.021	0.020	0.018	0.018	0.020	0.020	0.020	0.017	0.021	0.023	0.020	0.020	0.021	0.021	0.019	0.019	0.018	0.022	0.019
G141 Prethopalpus sp. S2 LN8445	0.218	0.226	0.224	0.263	0.165	0.252	0.184	0.213	0.230	0.188	0.189	0.192	0.227	0.132	0.130	0.130	0.130	0.123		0.018	0.018	0.021	0.021	0.020	0.019	0.017	0.018	0.018	0.020	0.022	0.018	0.021	0.022	0.018	0.017	0.020	0.020	0.020	0.017	0.020	0.021	0.020
G142 Desognanops sp. n. Y1 LN8482	0.216	0.181	0.198	0.243	0.216	0.235	0.231	0.181	0.202	0.276	0.282	0.215	0.199	0.215	0.209	0.209	0.211	0.204	0.202		0.011	0.021	0.021	0.021	0.019	0.019	0.018	0.019	0.019	0.018	0.017	0.017	0.022	0.019	0.019	0.018	0.018	0.018	0.018	0.019	0.018	0.017
G145 Desognanops sp. n. Y1 LN6635	0.209	0.190	0.183	0.243	0.214	0.235	0.246	0.172	0.182	0.267	0.282	0.237	0.180	0.187	0.191	0.191	0.204	0.209	0.202	0.085		0.019	0.020	0.020	0.018	0.018	0.016	0.018	0.018	0.018	0.018	0.019	0.021	0.019	0.019	0.018	0.017	0.020	0.018	0.019	0.020	0.015
G209 109675	0.262	0.228	0.233	0.134	0.254	0.130	0.266	0.215	0.219	0.267	0.285	0.260	0.214	0.245	0.253	0.249	0.249	0.236	0.255	0.240	0.240		0.014	0.014	0.015	0.018	0.021	0.023	0.021	0.020	0.022	0.023	0.016	0.021	0.021	0.020	0.020	0.021	0.023	0.021	0.020	0.021
G210 107945	0.264	0.220	0.241	0.135	0.264	0.117	0.287	0.220	0.227	0.247	0.260	0.235	0.225	0.276	0.276	0.278	0.283	0.278	0.278	0.246	0.230	0.136		0.007	0.016	0.021	0.020	0.025	0.022	0.019	0.022	0.021	0.016	0.021	0.022	0.020	0.019	0.021	0.022	0.020	0.021	0.021
G226 107786	0.255	0.210	0.233	0.121	0.253	0.105	0.292	0.219	0.226	0.264	0.272	0.240	0.228	0.285	0.288	0.281	0.295	0.283	0.269	0.235	0.231	0.144	0.025		0.016	0.021	0.021	0.024	0.021	0.019	0.022	0.021	0.015	0.022	0.021	0.020	0.019	0.021	0.021	0.020	0.021	0.022
G227 MC8638	0.257	0.196	0.223	0.124	0.247	0.130	0.261	0.198	0.216	0.253	0.260	0.240	0.212	0.232	0.232	0.235	0.254	0.230	0.247	0.203	0.213	0.133	0.135	0.134		0.019	0.020	0.024	0.019	0.019	0.020	0.018	0.017	0.020	0.020	0.020	0.019	0.019	0.019	0.020	0.020	0.020
G307 LN9925 Gnaphosidae sp MJ	0.253	0.240	0.249	0.240	0.194	0.223	0.200	0.228	0.249	0.199	0.211	0.192	0.246	0.182	0.180	0.178	0.182	0.182	0.182	0.208	0.213	0.222	0.250	0.248	0.226		0.011	0.016	0.019	0.022	0.017	0.020	0.022	0.018	0.018	0.020	0.020	0.020	0.018	0.018	0.021	0.019
G308 LN9827 Oonopidae sp MJ	0.248	0.229	0.238	0.240	0.189	0.214	0.186	0.206	0.231	0.170	0.167	0.187	0.224	0.184	0.178	0.169	0.178	0.182	0.173	0.191	0.206	0.218	0.252	0.244	0.226	0.059		0.018	0.018	0.021	0.017	0.020	0.022	0.019	0.019	0.020	0.020	0.019	0.017	0.021	0.020
G309 LN8606 Prethopalpus sp MA	0.239	0.215	0.205	0.228	0.176	0.229	0.198	0.195	0.209	0.210	0.220	0.189	0.206	0.173	0.182	0.184	0.169	0.184	0.173	0.215	0.195	0.246	0.264	0.255	0.237	0.171	0.173		0.018	0.021	0.019	0.021	0.027	0.018	0.019	0.020	0.021	0.021	0.019	0.019	0.021	0.019
GH12 Selinopidae PES16307	0.200	0.155	0.170	0.233	0.222	0.241	0.194	0.166	0.172	0.278	0.276	0.242	0.180	0.210	0.212	0.223	0.223	0.221	0.232	0.189	0.182	0.268	0.250	0.244	0.242	0.218	0.220	0.218		0.021	0.019	0.021	0.022	0.018	0.018	0.019	0.019	0.020	0.019	0.019	0.020	0.019
GU684645 Theridion ohlerti Theridiidae	0.214	0.116	0.158	0.212	0.223	0.196	0.259	0.101	0.169	0.290	0.297	0.253	0.173	0.235	0.242	0.233	0.240	0.240	0.249	0.194	0.189	0.210	0.221	0.214	0.209	0.246	0.227	0.220	0.192		0.020	0.018	0.019	0.020	0.020	0.017	0.018	0.017	0.014	0.021	0.017	0.019
IV272 MEBRC0016P1T1-2	0.237	0.223	0.251	0.255	0.222	0.232	0.211	0.234	0.221	0.207	0.211	0.210	0.224	0.194	0.191	0.191	0.202	0.189	0.200	0.202	0.213	0.245	0.236	0.230	0.234	0.206	0.202	0.211	0.242	0.248		0.020	0.023	0.016	0.016	0.019	0.018	0.019	0.019	0.016	0.021	0.019
IV275 127039	0.198	0.133	0.163	0.235	0.227	0.228	0.252	0.141	0.174	0.293	0.303	0.260	0.175	0.232	0.230	0.232	0.238	0.234	0.226	0.183	0.198	0.232	0.239	0.239	0.200	0.230	0.224	0.246	0.198	0.147	0.240		0.021	0.019	0.019	0.019	0.019	0.014	0.014	0.021	0.014	0.018
IV276 138441	0.262	0.201	0.243	0.115	0.250	0.108	0.314	0.210	0.238	0.261	0.279	0.265	0.237	0.272	0.274	0.264	0.289	0.274	0.269	0.256	0.241	0.140	0.122	0.124	0.132	0.269	0.261	0.266	0.282	0.186	0.250	0.230		0.025	0.024	0.020	0.020	0.021	0.021	0.022	0.021	0.023
IV345 SSp-2010-253 DCBRC 017	0.235	0.237	0.229	0.244	0.194	0.237	0.169	0.221	0.217	0.190	0.189	0.154	0.219	0.199	0.199	0.192	0.217	0.189	0.187	0.192	0.203	0.249	0.245	0.253	0.235	0.171	0.176	0.174	0.221	0.236	0.178	0.242	0.269		0.006	0.019	0.019	0.020	0.020	0.018	0.019	0.018
IV346 SSp-2010-75 DCBRC 040	0.226	0.235	0.231	0.240	0.189	0.237	0.169	0.219	0.219	0.179	0.176	0.144	0.221	0.194	0.194	0.192	0.212	0.187	0.178	0.192	0.203	0.251	0.241	0.248	0.235	0.169	0.176	0.169	0.219	0.241	0.171	0.242	0.266	0.014		0.019	0.019	0.020	0.020	0.017	0.020	0.017
KD01 GR15MEB0014.20160915.T1-01	0.195	0.139	0.166	0.206	0.215	0.210	0.228	0.096	0.168	0.273	0.285	0.230	0.172	0.226	0.230	0.215	0.226	0.228	0.226	0.177	0.181	0.210	0.220	0.216	0.212	0.218	0.202	0.211	0.178	0.123	0.221	0.174	0.225	0.216	0.218		0.004	0.019	0.016	0.017	0.016	0.017
KD02 RC15MEC0001.20160915.T1-01	0.189	0.136	0.165	0.205	0.207	0.205	0.231	0.093	0.174	0.264	0.282	0.232	0.180	0.222	0.227	0.211	0.222	0.224	0.227	0.176	0.180	0.216	0.216	0.212	0.204	0.212	0.203	0.216	0.177	0.123	0.218	0.175	0.221	0.217	0.219	0.009		0.019	0.016	0.018	0.016	0.017
KJ957946 Arachnura scorpionoides Aranidae	0.205	0.127	0.168	0.238	0.235	0.230	0.234	0.155	0.170	0.287	0.294	0.240	0.171	0.223	0.223	0.226	0.230	0.217	0.251	0.191	0.200	0.223	0.232	0.232	0.202	0.213	0.204	0.213	0.200	0.147	0.220	0.114	0.230	0.228	0.224	0.174	0.172		0.015	0.019	0.017	0.019
KJ957966 Gea theridioides Aranidae	0.205	0.129	0.172	0.235	0.231	0.226	0.245	0.137	0.166	0.287	0.297	0.245	0.167	0.251	0.257	0.247	0.251	0.253	0.240	0.204	0.221	0.232	0.245	0.241	0.217	0.224	0.232	0.226	0.188	0.136	0.240	0.124	0.235	0.226	0.226	0.163	0.164	0.140		0.020	0.018	0.018
KR864743 Ischnothyreus auritus Oonopidae	0.236	0.234	0.247	0.269	0.208	0.254	0.217	0.245	0.230	0.256	0.257	0.230	0.231	0.199	0.199	0.210	0.221	0.205	0.226	0.246	0.230	0.253	0.252	0.253	0.255	0.218	0.225	0.227	0.223	0.254	0.164	0.236	0.279	0.220	0.218	0.199	0.204	0.241	0.245		0.023	0.019
KX537094 Theridion boesenbergi Theriidae	0.203	0.118	0.169	0.221	0.234	0.225	0.239	0.088	0.189	0.281	0.294	0.258	0.193	0.233	0.233	0.221	0.230	0.233	0.247	0.189	0.203	0.230	0.232	0.228	0.214	0.227	0.217	0.225	0.161	0.125	0.257	0.136	0.245	0.236	0.239	0.114	0.111	0.156	0.150	0.246		0.019
Zelanda sp. CG213 isolate ARACG000213	0.153	0.187	0.136	0.244	0.218	0.247	0.230	0.172	0.132	0.273	0.282	0.273	0.129	0.213	0.217	0.226	0.230	0.219	0.226	0.202	0.194	0.247	0.250	0.244	0.223	0.239	0.235	0.224	0.188	0.194	0.238	0.173	0.252	0.231	0.235	0.173	0.172	0.179	0.185	0.236	0.180	

1. Tamura K., Stecher G., Peterson D., Filipski A., and Kumar S. (2013). MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. Molecular Biology and Evolution30: 2725-2729.

The number of base differences per site from between sequences are shown. Standard error estimate(s) are shown above the diagonal. The analysis involved 42 nucleotide sequences. Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair. There were a total of 495 positions in the final dataset. Evolutionary analyses were conducted in MEGA6 [1].

Table 8. Estimates of Evolutionary Divergence between Sequences

Specimen ID	LI44 E84259	LI45 E84277	CF10 SF0139R Curculionidae Genus 1 sp. B07	CF13 SF0725R Curculionidae Genus 1 sp. B09	CF5 GB0002R Curculionidae Genus 1 sp. B06	CF6 GF0421R Curculionidae Genus 1 sp. B02	CF7 PSC0890R Curculionidae Genus 1 sp. B02	CF8 PSD0107R Curculionidae Genus 1 sp. B08	CF9 SF0034R Curculionidae Genus 1 sp. B07	G115 Curculionidae	IV148 DD14MRR009-20150808-T3-01	IV150 RC14MEB0060-20151001-T2-02	IV152 MEARC4400-t1-01	IV234 RC15MEC0192-20160316-T3-03	IV395 MEK1478P7T2-2	KD03 GR15MEB0003.20160915.T3-01	KD04 RC15MEB0216.20160915.T3-02	KD05 GR15MEC0019.20160915.T2-01	KU519717 WAME89186 Curculionidae sp. 8	WAME89091 Curculionidae sp. 3	WAME89114 Curculionidae sp. 3	WAME89115 Curculionidae sp. 3	WAME89116 Curculionidae sp.3	WAME89146 Curculionidae sp. 1	WAME89147 Curculionidae sp. 1	WAME89148 Curculionidae sp. 1	WAME89151 Curculionidae sp. 2	WAME89157 Curculionidae sp. 1	WAME89172 Curculionidae sp. 4	WAME89177 Curculionidae sp. 7	WAME89188 Curculionidae sp. 8	WAME89154 Curculionidae sp. 4
LI44 E84259		0.003	0.016	0.016	0.017	0.016	0.017	0.017	0.016	0.021	0.016	0.002	0.007	0.002	0.014	0.000	0.002	0.002	0.006	0.018	0.017	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.015	0.007	0.017
LI45 E84277	0.009		0.017	0.017	0.017	0.016	0.017	0.017	0.016	0.020	0.016	0.003	0.008	0.002	0.013	0.003	0.004	0.003	0.006	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.007	0.017
CF10 SF0139R Curculionidae Genus 1 sp. B07	0.216	0.226		0.004	0.007	0.005	0.008	0.007	0.004	0.016	0.015	0.017	0.016	0.017	0.017	0.016	0.017	0.017	0.017	0.007	0.007	0.007	0.008	0.012	0.012	0.012	0.014	0.012	0.015	0.017	0.014
CF13 SF0725R Curculionidae Genus 1 sp. B09	0.216	0.226	0.014		0.007	0.005	0.008	0.006	0.004	0.017	0.014	0.017	0.016	0.017	0.017	0.016	0.017	0.017	0.017	0.008	0.006	0.007	0.008	0.013	0.013	0.013	0.014	0.012	0.014	0.017	0.014
CF5 GB0002R Curculionidae Genus 1 sp. B06	0.221	0.230	0.038	0.035		0.007	0.008	0.007	0.006	0.015	0.015	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.008	0.008	0.007	0.008	0.013	0.013	0.013	0.012	0.014	0.015	0.017	0.018	0.015
CF6 GF0421R Curculionidae Genus 1 sp. B02	0.213	0.223	0.024	0.021	0.036		0.007	0.007	0.005	0.016	0.015	0.016	0.016	0.016	0.017	0.016	0.016	0.016	0.017	0.008	0.007	0.007	0.008	0.012	0.012	0.012	0.013	0.013	0.014	0.016	0.016	0.014
CF7 PSC0890R Curculionidae Genus 1 sp. B02	0.215	0.221	0.039	0.038	0.046	0.045		0.004	0.007	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.005	0.008	0.006	0.004	0.013	0.013	0.013	0.013	0.014	0.014	0.017	0.017	0.013
CF8 PSD0107R Curculionidae Genus 1 sp. B08	0.216	0.226	0.035	0.033	0.042	0.038	0.013		0.007	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.006	0.007	0.007	0.005	0.014	0.014	0.014	0.013	0.014	0.014	0.017	0.018	0.013
CF9 SF0034R Curculionidae Genus 1 sp. B07	0.206	0.215	0.014	0.014	0.029	0.024	0.041	0.039		0.016	0.014	0.016	0.016	0.016	0.017	0.016	0.016	0.016	0.016	0.007	0.006	0.006	0.007	0.012	0.012	0.012	0.013	0.013	0.014	0.016	0.016	0.014
G115 Curculionidae	0.223	0.217	0.124	0.130	0.126	0.124	0.132	0.137	0.124		0.020	0.021	0.020	0.021	0.021	0.021	0.021	0.021	0.021	0.017	0.018	0.017	0.017	0.002	0.006	0.006	0.016	0.007	0.017	0.021	0.021	0.019
IV148 DD14MRR009-20150808-T3-01	0.189	0.198	0.176	0.171	0.173	0.180	0.177	0.177	0.167	0.211		0.016	0.015	0.016	0.015	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.016	0.016	0.016	0.016	0.017	0.016	0.015	0.014	0.016	0.016
IV150 RC14MEB0060-20151001-T2-02	0.001	0.006	0.220	0.220	0.224	0.217	0.215	0.217	0.209	0.222	0.190		0.007	0.000	0.014	0.002	0.002	0.000	0.006	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.016	0.017	0.016	0.016	0.007	0.017
IV152 MEARC4400-t1-01	0.034	0.034	0.221	0.218	0.228	0.218	0.223	0.224	0.214	0.227	0.190	0.032		0.007	0.013	0.007	0.007	0.007	0.006	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.016	0.017	0.016	0.015	0.002	0.017
IV234 RC15MEC0192-20160316-T3-03	0.001	0.005	0.222	0.222	0.226	0.219	0.217	0.219	0.212	0.221	0.192	0.000	0.033		0.014	0.002	0.002	0.000	0.006	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.016	0.017	0.016	0.016	0.007	0.017
IV395 MEK1478P7T2-2	0.130	0.129	0.217	0.220	0.226	0.219	0.213	0.217	0.216	0.242	0.179	0.129	0.135	0.129		0.014	0.014	0.014	0.014	0.018	0.017	0.017	0.017	0.015	0.016	0.016	0.017	0.016	0.016	0.017	0.014	0.016
KD03 GR15MEB0003.20160915.T3-01	0.000	0.009	0.217	0.217	0.221	0.214	0.215	0.217	0.206	0.223	0.189	0.001	0.034	0.001	0.130		0.002	0.002	0.006	0.018	0.017	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.015	0.007	0.017
KD04 RC15MEB0216.20160915.T3-02	0.004	0.011	0.218	0.218	0.220	0.213	0.217	0.215	0.208	0.221	0.190	0.003	0.035	0.003	0.132	0.004		0.002	0.007	0.017	0.017	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.016	0.016	0.007	0.017
KD05 GR15MEC0019.20160915.T2-01	0.001	0.006	0.219	0.219	0.223	0.216	0.215	0.216	0.209	0.222	0.190	0.000	0.032	0.000	0.129	0.001	0.003		0.006	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.016	0.017	0.016	0.016	0.007	0.017
KU519717 WAME89186 Curculionidae sp. 8	0.030	0.027	0.228	0.228	0.236	0.225	0.229	0.231	0.220	0.226	0.198	0.029	0.021	0.029	0.140	0.030	0.032	0.029		0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.015	0.006	0.017
WAME89091 Curculionidae sp. 3	0.228	0.228	0.036	0.040	0.049	0.041	0.017	0.018	0.040	0.129	0.184	0.226	0.234	0.226	0.223	0.228	0.226	0.226	0.233		0.007	0.007	0.005	0.013	0.013	0.013	0.013	0.014	0.014	0.017	0.017	0.014
WAME89114 Curculionidae sp. 3	0.228	0.228	0.038	0.035	0.044	0.043	0.041	0.033	0.035	0.136	0.184	0.229	0.234	0.229	0.217	0.228	0.233	0.229	0.233	0.036		0.004	0.008	0.014	0.014	0.014	0.014	0.013	0.015	0.017	0.017	0.013
WAME89115 Curculionidae sp. 3	0.223	0.223	0.035	0.032	0.041	0.040	0.035	0.033	0.029	0.129	0.175	0.225	0.229	0.225	0.216	0.223	0.228	0.225	0.228	0.033	0.012		0.007	0.013	0.013	0.013	0.013	0.014	0.014	0.016	0.016	0.014
WAME89116 Curculionidae sp.3	0.217	0.217	0.036	0.040	0.052	0.047	0.014	0.015	0.040	0.134	0.182	0.216	0.223	0.216	0.222	0.217	0.219	0.216	0.222	0.015	0.040	0.033		0.013	0.013	0.013	0.013	0.014	0.014	0.017	0.017	0.013
WAME89146 Curculionidae sp. 1	0.213	0.209	0.116	0.120	0.122	0.117	0.126	0.128	0.114	0.002	0.193	0.211	0.216	0.211	0.225	0.213	0.208	0.211	0.213	0.122	0.131	0.122	0.125		0.004	0.004	0.013	0.004	0.013	0.017	0.016	0.014
WAME89147 Curculionidae sp. 1	0.210	0.206	0.114	0.119	0.123	0.119	0.125	0.129	0.112	0.014	0.191	0.208	0.216	0.208	0.225	0.210	0.208	0.208	0.210	0.120	0.129	0.120	0.123	0.009		0.003	0.014	0.005	0.013	0.017	0.017	0.014
WAME89148 Curculionidae sp. 1	0.210	0.206	0.117	0.122	0.123	0.119	0.128	0.129	0.116	0.014	0.193	0.208	0.216	0.208	0.226	0.210	0.205	0.208	0.210	0.123	0.132	0.123	0.126	0.008	0.005		0.014	0.003	0.013	0.017	0.017	0.014
WAME89151 Curculionidae sp. 2	0.211	0.211	0.119	0.119	0.116	0.122	0.103	0.106	0.114	0.132	0.199	0.210	0.207	0.210	0.217	0.211	0.213	0.210	0.210	0.109	0.122	0.117	0.105	0.129	0.131	0.132		0.014	0.012	0.016	0.016	0.013
WAME89157 Curculionidae sp. 1	0.214	0.211	0.117	0.116	0.123	0.119	0.125	0.123	0.116	0.018	0.193	0.213	0.220	0.213	0.231	0.214	0.210	0.213	0.214	0.126	0.129	0.123	0.126	0.012	0.012	0.008	0.131		0.013	0.017	0.017	0.013
WAME89172 Curculionidae sp. 4	0.217	0.217	0.128	0.126	0.132	0.132	0.126	0.129	0.123	0.127	0.167	0.216	0.220	0.216	0.216	0.217	0.216	0.216	0.222	0.129	0.134	0.126	0.122	0.114	0.119	0.120	0.132	0.117		0.015	0.016	0.009
WAME89177 Curculionidae sp. 7	0.190	0.194	0.204	0.198	0.199	0.199	0.198	0.195	0.195	0.224	0.138	0.191	0.191	0.191	0.195	0.190	0.191	0.191	0.191	0.202	0.204	0.195	0.196	0.193	0.193	0.191	0.205	0.191	0.188		0.015	0.016
WAME89188 Curculionidae sp. 8	0.033	0.030	0.229	0.226	0.237	0.226	0.231	0.233	0.222	0.229	0.198	0.032	0.002	0.032	0.137	0.033	0.035	0.032	0.021	0.234	0.234	0.229	0.223	0.214	0.214	0.214	0.208	0.219	0.220	0.191		0.017
WAME89154 Curculionidae sp. 4	0.214	0.214	0.138	0.141	0.140	0.144	0.137	0.135	0.137	0.139	0.201	0.213	0.217	0.213	0.213	0.214	0.213	0.213	0.216	0.144	0.137	0.135	0.132	0.125	0.129	0.128	0.141	0.123	0.052	0.201	0.217	

1. Tamura K., Stecher G., Peterson D., Filipski A., and Kumar S. (2013). MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. Molecular Biology and Evolution30: 2725-2729.

The number of base differences per site from between sequences are shown. Standard error estimate(s) are shown above the diagonal. The analysis involved 42 nucleotide sequences. Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair. There were a total of 495 positions in the final dataset. Evolutionary analyses were conducted in MEGA6 [1].

Table 9. Estimates of Evolutionary Divergence between Sequences

Specimen ID	LI30 MEAWO4088-20170307-01	AF370844 Campodea tillyardi	BQ8 PES 4283 Japygidae won1 DJA003	BX16 PES-5195 Japygidae MH1 DJA004	BX17 PES-5952 Japygidae MH1 DJA005	BX29 PES-5141 Parajapygidae MH1 DPA002	BX30 PES-5190 Parajapygidae MH1 DPA002	Diplura sp. HQ943342	FH7 Japygidae sp B36 DLUNK03 DJA006	FH8 Japygidae sp B36 NOW sp EW0333 DJA007	G432 110953 Japygidae sp Central Pilbara DJA001	G433 110848 Japygidae Central Pilbara sp DJA002	GH6 Anajapygidae Ana-PES16402 DCA004	HQ882832 Lepidocampa weberi	IT74 BHRC0514-151013-T2-02 DJA008	IV154 DD11MEB001T1-01 DCA001	IV155 DD11MEB001T1-01 DCA002	IV156 DD11MEC0005-02 DPA004	IV157 DD14MEB0005-20151001-T3-02 DCA003	IV159 RC14MEB0101-20151001-T2-01 DCA003	IV245 RC15MEB0171-20160317-T1-01 DPA003	IV248 RC15MEC0192-20160316-T1-01 DPA005	Japyx solifugus AY771989	JC18 RC14BS4004-20151125-T2-01 DJA009	JF37 RC14MEH0308-20160120-T2-02 DPA001	JQ692327 Parajapyx pauliani voucher HN0405	JU01 RC14MEH0388.20160628.T3-1 DJA010	KD07 GR15MEB0014.20160915.T3-01	KD08 RC15MEB0115.20160915.T2-01	KD09 RC15MEB0115.20160915.T2-01	KD10 RC15MEB0115.20160915.T2-01	KD11 RC15MEB0115.20160915.T2-01	KD12 RC15MEC0103.20160915.T1-01	IV250 RC15MEC0192-20160316-T1-03 DPA006	KD13 RC14MEB0101.20160915.T2-01	KD14 RC16MEC0156.20160915.T3-01	KD15 RC16MEC0118.20160915.T3-01
LI30 MEAWO4088-20170307-01		0.017	0.015	0.013	0.013	0.015	0.014	0.013	0.013	0.013	0.012	0.014	0.016	0.015	0.017	0.016	0.016	0.013	0.015	0.015	0.015	0.015	0.014	0.014	0.014	0.015	0.013	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
AF370844 Campodea tillyardi	0.278		0.017	0.016	0.016	0.016	0.016	0.015	0.017	0.016	0.015	0.018	0.015	0.017	0.017	0.015	0.015	0.017	0.014	0.013	0.017	0.016	0.017	0.018	0.018	0.015	0.017	0.014	0.014	0.014	0.014	0.018	0.016	0.013	0.016	0.019
BQ8 PES 4283 Japygidae won1 DJA003	0.172	0.251		0.013	0.014	0.016	0.017	0.016	0.012	0.013	0.014	0.013	0.016	0.017	0.013	0.015	0.017	0.015	0.015	0.015	0.015	0.016	0.016	0.016	0.013	0.016	0.014	0.013	0.016	0.016	0.016	0.016	0.015	0.015	0.016	0.015	0.017
BX16 PES-5195 Japygidae MH1 DJA004	0.164	0.249	0.138		0.011	0.016	0.016	0.015	0.013	0.012	0.012	0.014	0.014	0.015	0.014	0.015	0.015	0.015	0.014	0.014	0.015	0.015	0.015	0.011	0.014	0.014	0.012	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.014	0.013	0.016
BX17 PES-5952 Japygidae MH1 DJA005	0.166	0.267	0.147	0.130		0.015	0.015	0.015	0.013	0.013	0.012	0.013	0.013	0.015	0.013	0.015	0.015	0.015	0.013	0.013	0.014	0.015	0.013	0.011	0.012	0.014	0.012	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.014
BX29 PES-5141 Parajapygidae MH1 DPA002	0.216	0.278	0.210	0.213	0.204		0.006	0.016	0.014	0.014	0.015	0.018	0.015	0.015	0.017	0.016	0.017	0.015	0.016	0.016	0.014	0.015	0.014	0.014	0.014	0.014	0.016	0.016	0.017	0.017	0.017	0.017	0.013	0.013	0.016	0.014	0.015
BX30 PES-5190 Parajapygidae MH1 DPA002	0.209	0.274	0.217	0.219	0.208	0.028		0.016	0.015	0.015	0.016	0.019	0.015	0.016	0.017	0.016	0.017	0.016	0.017	0.016	0.016	0.014	0.015	0.015	0.015	0.014	0.015	0.016	0.016	0.017	0.017	0.017	0.014	0.013	0.016	0.015	0.015
Diplura sp. HQ943342	0.245	0.214	0.216	0.220	0.248	0.263	0.267		0.017	0.016	0.015	0.016	0.017	0.016	0.017	0.015	0.015	0.017	0.014	0.014	0.016	0.016	0.018	0.016	0.017	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.018	0.017	0.014	0.017	0.019
FH7 Japygidae sp B36 DLUNK03 DJA006	0.150	0.263	0.152	0.138	0.156	0.200	0.204	0.246		0.012	0.013	0.013	0.014	0.017	0.015	0.015	0.016	0.014	0.014	0.014	0.014	0.015	0.014	0.012	0.014	0.015	0.012	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
FH8 Japygidae sp B36 NOW sp EW0333 DJA007	0.156	0.267	0.150	0.143	0.163	0.204	0.206	0.237	0.141		0.013	0.011	0.013	0.017	0.013	0.015	0.016	0.014	0.015	0.015	0.014	0.015	0.014	0.013	0.015	0.015	0.013	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
G432 110953 Japygidae sp Central Pilbara DJA001	0.144	0.270	0.172	0.157	0.149	0.202	0.212	0.247	0.165	0.171		0.014	0.015	0.015	0.014	0.014	0.016	0.014	0.015	0.014	0.017	0.016	0.015	0.014	0.015	0.014	0.014	0.014	0.015	0.015	0.015	0.015	0.015	0.014	0.014	0.014	0.014
G433 110848 Japygidae Central Pilbara sp DJA002	0.163	0.259	0.142	0.128	0.153	0.208	0.208	0.244	0.139	0.124	0.174		0.015	0.017	0.014	0.017	0.016	0.016	0.014	0.014	0.015	0.015	0.016	0.013	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015	0.014	0.015	0.015
GH6 Anajapygidae Ana-PES16402 DCA004	0.245	0.214	0.229	0.203	0.230	0.264	0.261	0.228	0.226	0.233	0.241	0.231		0.015	0.017	0.014	0.014	0.016	0.014	0.014	0.014	0.015	0.015	0.014	0.015	0.016	0.016	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.016
HQ882832 Lepidocampa weberi	0.237	0.233	0.230	0.204	0.213	0.247	0.244	0.233	0.234	0.231	0.252	0.227	0.227		0.017	0.017	0.017	0.018	0.016	0.016	0.017	0.017	0.016	0.016	0.016	0.015	0.015	0.016	0.016	0.015	0.015	0.015	0.015	0.015	0.017	0.016	0.016	0.017
IT74 BHRC0514-151013-T2-02 DJA008	0.155	0.277	0.163	0.161	0.152	0.223	0.232	0.242	0.150	0.147	0.158	0.155	0.257	0.258		0.015	0.016	0.015	0.016	0.016	0.016	0.016	0.016	0.015	0.013	0.015	0.015	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016
IV154 DD11MEB001T1-01 DCA001	0.266	0.219	0.248	0.229	0.252	0.273	0.276	0.249	0.243	0.251	0.255	0.261	0.188	0.253	0.257		0.014	0.017	0.013	0.013	0.015	0.015	0.015	0.016	0.016	0.016	0.015	0.013	0.013	0.013	0.013	0.013	0.016	0.016	0.013	0.016	0.015
IV155 DD11MEB001T1-01 DCA002	0.270	0.222	0.233	0.215	0.237	0.270	0.268	0.227	0.249	0.246	0.263	0.247	0.167	0.211	0.257	0.144		0.015	0.009	0.008	0.016	0.015	0.018	0.018	0.017	0.015	0.016	0.009	0.009	0.009	0.009	0.009	0.017	0.015	0.008	0.016	0.016
IV156 DD11MEC0005-02 DPA004	0.193	0.281	0.185	0.203	0.204	0.175	0.178	0.263	0.190	0.203	0.205	0.191	0.257	0.263	0.197	0.261	0.256		0.015	0.014	0.014	0.015	0.015	0.013	0.014	0.015	0.016	0.015	0.015	0.015	0.015	0.015	0.014	0.014	0.015	0.014	0.013
IV157 DD14MEB0005-20151001-T3-02 DCA003	0.258	0.216	0.226	0.210	0.223	0.258	0.255	0.223	0.245	0.245	0.246	0.227	0.166	0.213	0.252	0.153	0.054	0.243		0.003	0.014	0.014	0.017	0.017	0.015	0.014	0.016	0.002	0.003	0.003	0.003	0.003	0.016	0.015	0.003	0.015	0.015
IV159 RC14MEB0101-20151001-T2-01 DCA003	0.260	0.214	0.224	0.210	0.224	0.258	0.255	0.222	0.242	0.243	0.245	0.226	0.165	0.215	0.254	0.153	0.047	0.241	0.006		0.014	0.015	0.017	0.017	0.015	0.014	0.016	0.003	0.004	0.004	0.004	0.004	0.016	0.015	0.000	0.015	0.015
IV245 RC15MEB0171-20160317-T1-01 DPA003	0.215	0.263	0.222	0.199	0.221	0.221	0.215	0.236	0.219	0.224	0.233	0.220	0.249	0.263	0.223	0.274	0.267	0.207	0.256	0.256		0.011	0.013	0.014	0.013	0.013	0.017	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.014	0.014	0.014
IV248 RC15MEC0192-20160316-T1-01 DPA005	0.221	0.263	0.200	0.215	0.224	0.218	0.215	0.245	0.218	0.209	0.232	0.197	0.234	0.242	0.212	0.268	0.261	0.194	0.244	0.246	0.121		0.014	0.015	0.015	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.014	0.016
Japyx solifugus AY771989	0.201	0.260	0.185	0.179	0.200	0.223	0.224	0.243	0.203	0.192	0.196	0.185	0.241	0.250	0.172	0.257	0.254	0.207	0.239	0.242	0.203	0.215		0.015	0.014	0.015	0.014	0.017	0.017	0.017	0.017	0.017	0.015	0.015	0.017	0.015	0.015
JC18 RC14BS4004-20151125-T2-01 DJA009	0.158	0.271	0.165	0.150	0.175	0.194	0.207	0.243	0.137	0.130	0.174	0.159	0.248	0.247	0.141	0.255	0.252	0.204	0.251	0.252	0.221	0.229	0.195		0.013	0.013	0.015	0.017	0.017	0.017	0.017	0.017	0.013	0.013	0.018	0.013	0.014
JF37 RC14MEH0308-20160120-T2-02 DPA001	0.177	0.289	0.195	0.187	0.191	0.166	0.181	0.252	0.181	0.175	0.197	0.180	0.251	0.251	0.193	0.258	0.252	0.134	0.243	0.242	0.181	0.191	0.216	0.179		0.013	0.016	0.016	0.015	0.015	0.015	0.015	0.013	0.013	0.016	0.013	0.013
JQ692327 Parajapyx pauliani voucher HN0405	0.188	0.271	0.173	0.167	0.184	0.187	0.182	0.248	0.191	0.170	0.191	0.173	0.248	0.218	0.184	0.272	0.250	0.181	0.243	0.242	0.198	0.213	0.195	0.185	0.163		0.014	0.014	0.015	0.015	0.015	0.015	0.014	0.013	0.014	0.013	0.014
JU01 RC14MEH0388.20160628.T3-1 DJA010	0.108	0.272	0.156	0.171	0.168	0.225	0.229	0.248	0.153	0.164	0.174	0.160	0.251	0.244	0.166	0.261	0.254	0.203	0.242	0.242	0.218	0.218	0.196	0.178	0.185	0.199		0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.016	0.016	0.016
KD07 GR15MEB0014.20160915.T3-01	0.262	0.216	0.230	0.214	0.227	0.264	0.261	0.222	0.249	0.249	0.248	0.230	0.165	0.213	0.256	0.153	0.054	0.244	0.003	0.006	0.258	0.247	0.242	0.256	0.244	0.246	0.246		0.003	0.003	0.003	0.003	0.016	0.015	0.003	0.015	0.015
KD08 RC15MEB0115.20160915.T2-01	0.264	0.214	0.227	0.215	0.227	0.261	0.258	0.223	0.250	0.250	0.245	0.231	0.168	0.213	0.256	0.152	0.057	0.246	0.006	0.009	0.258	0.247	0.240	0.256	0.249	0.248	0.246	0.006		0.000	0.000	0.000	0.016	0.015	0.004	0.015	0.015
KD09 RC15MEB0115.20160915.T2-01	0.264	0.214	0.227	0.215	0.227	0.261	0.258	0.223	0.250	0.250	0.245	0.231	0.168	0.213	0.256	0.152	0.057	0.246	0.006	0.009	0.258	0.247	0.240	0.256	0.249	0.248	0.246	0.006	0.000		0.000	0.000	0.016	0.015	0.004	0.015	0.015
KD10 RC15MEB0115.20160915.T2-01	0.264	0.214	0.227	0.215	0.227	0.261	0.258	0.223	0.250	0.250	0.245	0.231	0.168	0.213	0.256	0.152	0.057	0.246	0.006	0.009	0.258	0.247	0.240	0.256	0.249	0.248	0.246	0.006	0.000	0.000		0.000	0.016	0.015	0.004	0.015	0.015
KD11 RC15MEB0115.20160915.T2-01	0.264	0.214	0.227	0.215	0.227	0.261	0.258	0.223	0.250	0.250	0.245	0.231	0.168	0.213	0.256	0.152	0.057	0.246	0.006	0.009	0.258	0.247	0.240	0.256	0.249	0.248	0.246	0.006	0.000	0.000	0.000		0.016	0.015	0.004	0.015	0.015
KD12 RC15MEC0103.20160915.T1-01	0.185	0.269	0.197	0.186	0.200	0.191	0.186	0.257	0.170	0.176	0.201	0.182	0.241	0.265	0.215	0.273	0.266	0.164	0.261	0.261	0.188	0.191	0.204	0.181	0.156	0.185	0.192	0.261	0.265	0.265	0.265	0.265		0.008	0.016	0.008	0.013
IV250 RC15MEC0192-20160316-T1-03 DPA006	0.185	0.271	0.197	0.188	0.196	0.175	0.174	0.269	0.172	0.181	0.203	0.186	0.238	0.256	0.215	0.257	0.263	0.169	0.246	0.247	0.191	0.188	0.204	0.190	0.160	0.175	0.196	0.245	0.248	0.248	0.248	0.248	0.050		0.015	0.004	0.012
KD13 RC14MEB0101.20160915.T2-01	0.262	0.214	0.227	0.212	0.227	0.261	0.258	0.222	0.244	0.246	0.245	0.227	0.165	0.215	0.256	0.155	0.048	0.243	0.006	0.000	0.257	0.247	0.242	0.255	0.244	0.242	0.244	0.006	0.009	0.009	0.009	0.009	0.262	0.248		0.015	0.015
KD14 RC16MEC0156.20160915.T3-01	0.189	0.266	0.191	0.183	0.196	0.181	0.183	0.266	0.172	0.184	0.197	0.182	0.234	0.259	0.220	0.255	0.256	0.163	0.243	0.244	0.189	0.189	0.206	0.187	0.153	0.172	0.194	0.242	0.244	0.244	0.244	0.244	0.046	0.015	0.244		0.012
KD15 RC16MEC0118.20160915.T3-01	0.192	0.283	0.189	0.195	0.210	0.181	0.179	0.245	0.189	0.185	0.207	0.191	0.241	0.253	0.188	0.264	0.261	0.163	0.245	0.245	0.204	0.195	0.189	0.191	0.150	0.184	0.197	0.247	0.250	0.250	0.250	0.250	0.150	0.154	0.246	0.155	

1. Tamura K., Stecher G., Peterson D., Filipski A., and Kumar S. (2013). MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. Molecular Biology and Evolution30: 2725-2729.

The number of base differences per site from between sequences are shown. Standard error estimate(s) are shown above the diagonal. The analysis involved 42 nucleotide sequences. Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair. There were a total of 495 positions in the final dataset. Evolutionary analyses were conducted in MEGA6 [1].

Table 10. Estimates of Evolutionary Divergence between Sequences

Specimen ID	LI33 MEAWO4086-20170308-04 Thysanura 12S	JQ282164 Trinemura callawa CA0006	JQ282165 Trinemura cundalin CU0060R LN1093	G318 LN8588 Nicoletiidae sp. MC TN001	EXR0919 J16-1 TN001	PROP003 J16-2 Trimenura TN002	G317 LN8923 Nicoletiidae sp. OP TN002	JIN0037R J8 25 Jinaryi TN002	G126 TN003	G205 100101 TN003	G207 107781 TN003	G206 108042 TN004	AY2 BES16311 B10 TN005	AY3 BES15706 S9 Trinemura TN005	BX42 PES-5266 Trinemura MH1 TN006	BX43 PES-5964 Trinemura MH1 TN007	CQ10 Trinemura sp. B18 CC1886 TN008	CQ11 Trinemura sp. B15 CC0179 TN009	CQ12 Trinemura sp. B15 CCMUNK11 TN009	CQ8 Trinemura sp. GNGCUNK011 TN008	CQ9 Trinemura sp. B20 CC3527 TN009	IV227 MEARC4383 TN010	IV333 MEBRC0020T1-20 TN010	IV334 M2ERC0057T1-21 TN011	EJ0245R BHP165 J2 36 OB18 TN011	IV338 GR15MEC0001-20160316-T2-06 TN012	IV339 RC15MEC0197-20160316-T2-01 TN012	CA37 12:0096 Trinemura indet. TN013	CA39 11:1511 Trinemura indet. TN013	FL4 TOBRC0011PIT2-1 B TN014	EXR0983 BHP821 J8 13 Jimblebar W TN015	CQ13 Trinemura sp. B19 CC0748 TN016	JIN0182R BHP465 J2 37 Jinaryi TN016	EXR1136 BHP1364 J8 15 Mudlark TN016	EXR0524 OB21 OB22 TN016
LI33 MEAWO4086-20170308-04		0.022	0.023	0.019	0.019	0.022	0.018	0.020	0.019	0.018	0.018	0.016	0.023	0.019	0.018	0.018	0.017	0.020	0.022	0.018	0.019	0.007	0.003	0.016	0.022	0.015	0.014	0.016	0.017	0.014	0.014	0.021	0.019	0.020	0.020
JQ282164 Trinemura callawa CA0006	0.149		0.014	0.017	0.017	0.022	0.020	0.021	0.021	0.021	0.021	0.021	0.021	0.020	0.020	0.020	0.020	0.022	0.021	0.020	0.022	0.021	0.022	0.021	0.019	0.018	0.019	0.018	0.018	0.020	0.023	0.019	0.019	0.018	0.020
JQ282165 Trinemura cundalin CU0060R LN1093	0.164	0.065		0.018	0.017	0.021	0.019	0.019	0.020	0.020	0.019	0.019	0.023	0.021	0.019	0.018	0.021	0.023	0.022	0.021	0.021	0.022	0.023	0.022	0.019	0.018	0.019	0.020	0.020	0.020	0.021	0.020	0.019	0.018	0.020
G318 LN8588 Nicoletiidae sp. MC TN001	0.194	0.132	0.144		0.006	0.020	0.019	0.018	0.016	0.017	0.017	0.018	0.017	0.013	0.020	0.018	0.021	0.018	0.021	0.020	0.021	0.018	0.019	0.019	0.020	0.019	0.018	0.018	0.018	0.018	0.018	0.021	0.018	0.018	0.019	0.018
EXR0919 J16-1 TN001	0.174	0.142	0.151	0.012		0.020	0.018	0.018	0.018	0.019	0.018	0.018	0.017	0.016	0.020	0.017	0.021	0.021	0.020	0.021	0.018	0.019	0.019	0.022	0.019	0.020	0.020	0.019	0.020	0.020	0.020	0.017	0.018	0.018	0.018
PROP003 J16-2 Trimenura TN002	0.169	0.214	0.216	0.185	0.189		0.014	0.014	0.019	0.020	0.019	0.021	0.026	0.024	0.022	0.018	0.024	0.025	0.024	0.024	0.023	0.022	0.022	0.022	0.022	0.023	0.023	0.023	0.023	0.022	0.023	0.021	0.020	0.021	0.021
G317 LN8923 Nicoletiidae sp. OP TN002	0.164	0.207	0.204	0.182	0.172	0.086		0.016	0.015	0.015	0.014	0.016	0.024	0.020	0.020	0.014	0.021	0.022	0.023	0.021	0.020	0.019	0.018	0.021	0.021	0.019	0.019	0.018	0.018	0.020	0.021	0.016	0.018	0.020	0.019
JIN0037R J8 25 Jinaryi TN002	0.141	0.183	0.183	0.163	0.173	0.074	0.089		0.018	0.018	0.018	0.017	0.024	0.022	0.023	0.016	0.021	0.024	0.025	0.021	0.021	0.020	0.020	0.022	0.020	0.022	0.022	0.022	0.022	0.022	0.020	0.020	0.018	0.020	0.018
G126 TN003	0.176	0.215	0.202	0.169	0.180	0.142	0.104	0.123		0.007	0.000	0.016	0.023	0.018	0.019	0.015	0.022	0.019	0.021	0.021	0.016	0.020	0.019	0.020	0.020	0.019	0.020	0.019	0.020	0.020	0.020	0.018	0.017	0.019	0.020
G205 100101 TN003	0.175	0.207	0.201	0.198	0.188	0.153	0.119	0.137	0.023		0.007	0.015	0.023	0.020	0.018	0.014	0.020	0.020	0.022	0.020	0.017	0.019	0.018	0.020	0.019	0.018	0.017	0.018	0.018	0.018	0.019	0.018	0.017	0.018	0.019
G207 107781 TN003	0.168	0.213	0.201	0.190	0.185	0.147	0.106	0.125	0.000	0.022		0.015	0.023	0.019	0.018	0.014	0.020	0.020	0.021	0.020	0.016	0.019	0.018	0.019	0.020	0.018	0.018	0.018	0.019	0.018	0.019	0.017	0.017	0.019	0.019
G206 108042 TN004	0.141	0.196	0.190	0.196	0.183	0.155	0.135	0.131	0.104	0.113	0.097		0.023	0.020	0.017	0.015	0.020	0.021	0.023	0.019	0.019	0.017	0.016	0.019	0.020	0.018	0.017	0.019	0.019	0.017	0.019	0.018	0.017	0.022	0.020
AY2 BES16311 B10 TN005	0.206	0.173	0.187	0.115	0.115	0.203	0.206	0.196	0.208	0.210	0.207	0.218		0.003	0.027	0.022	0.024	0.021	0.020	0.026	0.019	0.023	0.024	0.026	0.022	0.022	0.022	0.022	0.021	0.023	0.024	0.021	0.024	0.023	0.023
AY3 BES15706 S9 Trinemura TN005	0.217	0.160	0.171	0.108	0.117	0.204	0.215	0.182	0.191	0.216	0.211	0.222	0.003		0.020	0.019	0.023	0.020	0.020	0.024	0.018	0.020	0.020	0.021	0.020	0.020	0.019	0.019	0.019	0.020	0.023	0.021	0.022	0.022	0.021
BX42 PES-5266 Trinemura MH1 TN006	0.124	0.177	0.180	0.212	0.192	0.191	0.155	0.172	0.172	0.170	0.163	0.161	0.242	0.244		0.018	0.021	0.021	0.023	0.020	0.019	0.018	0.017	0.016	0.021	0.018	0.017	0.018	0.018	0.017	0.018	0.020	0.020	0.019	0.019
BX43 PES-5964 Trinemura MH1 TN007	0.141	0.180	0.176	0.167	0.154	0.125	0.098	0.119	0.125	0.126	0.119	0.127	0.185	0.196	0.144		0.021	0.020	0.022	0.022	0.018	0.021	0.018	0.020	0.021	0.019	0.018	0.018	0.019	0.019	0.022	0.018	0.016	0.016	0.019
CQ10 Trinemura sp. B18 CC1886 TN008	0.130	0.184	0.206	0.234	0.208	0.203	0.213	0.163	0.204	0.197	0.197	0.195	0.221	0.257	0.181	0.201		0.020	0.020	0.009	0.019	0.016	0.018	0.016	0.022	0.016	0.016	0.019	0.020	0.015	0.019	0.019	0.020	0.021	0.021
CQ11 Trinemura sp. B15 CC0179 TN009	0.152	0.173	0.172	0.155	0.160	0.190	0.155	0.159	0.133	0.145	0.136	0.158	0.173	0.174	0.175	0.151	0.196		0.006	0.022	0.006	0.020	0.020	0.023	0.022	0.022	0.022	0.019	0.020	0.020	0.022	0.018	0.019	0.020	0.020
CQ12 Trinemura sp. B15 CCMUNK11 TN009	0.153	0.160	0.170	0.150	0.151	0.174	0.160	0.156	0.142	0.152	0.145	0.160	0.176	0.176	0.179	0.152	0.187	0.011		0.022	0.008	0.021	0.022	0.023	0.023	0.023	0.024	0.020	0.021	0.021	0.022	0.018	0.020	0.020	0.022
CQ8 Trinemura sp. GNGCUNK011 TN008	0.130	0.184	0.206	0.229	0.205	0.199	0.210	0.160	0.204	0.197	0.197	0.184	0.221	0.254	0.169	0.201	0.031	0.199	0.191		0.020	0.015	0.018	0.017	0.022	0.017	0.018	0.018	0.019	0.015	0.020	0.020	0.021	0.022	0.023
CQ9 Trinemura sp. B20 CC3527 TN009	0.148	0.167	0.163	0.169	0.142	0.174	0.148	0.135	0.124	0.134	0.120	0.151	0.168	0.197	0.160	0.145	0.182	0.016	0.021	0.185		0.018	0.019	0.020	0.021	0.019	0.019	0.017	0.017	0.018	0.020	0.015	0.017	0.020	0.019
IV227 MEARC4383 TN010	0.028	0.161	0.176	0.216	0.193	0.169	0.174	0.147	0.180	0.171	0.168	0.152	0.213	0.232	0.142	0.168	0.110	0.171	0.171	0.104	0.168		0.007	0.017	0.021	0.015	0.015	0.016	0.017	0.013	0.016	0.020	0.019	0.019	0.020
IV333 MEBRC0020T1-20 TN010	0.005	0.152	0.167	0.194	0.177	0.166	0.164	0.141	0.176	0.175	0.168	0.142	0.209	0.217	0.124	0.147	0.135	0.152	0.156	0.130	0.148	0.028		0.017	0.022	0.015	0.015	0.016	0.017	0.015	0.014	0.020	0.019	0.020	0.020
IV334 M2ERC0057T1-21 TN011	0.122	0.185	0.203	0.205	0.190	0.187	0.189	0.162	0.192	0.180	0.183	0.189	0.230	0.242	0.124	0.164	0.136	0.184	0.178	0.133	0.171	0.127	0.127		0.023	0.015	0.014	0.017	0.017	0.016	0.019	0.020	0.021	0.022	0.020
EJ0245R BHP165 J2 36 OB18 TN011	0.187	0.212	0.182	0.182	0.187	0.175	0.165	0.139	0.145	0.144	0.147	0.158	0.218	0.207	0.215	0.168	0.210	0.139	0.136	0.203	0.142	0.193	0.190	0.193		0.021	0.021	0.021	0.021	0.020	0.021	0.023	0.016	0.020	0.016
IV338 GR15MEC0001-20160316-T2-06 TN012	0.119	0.160	0.162	0.192	0.164	0.201	0.197	0.167	0.188	0.171	0.176	0.182	0.187	0.221	0.162	0.175	0.101	0.187	0.188	0.098	0.171	0.122	0.124	0.128	0.189		0.006	0.015	0.015	0.014	0.018	0.019	0.021	0.022	0.022
IV339 RC15MEC0197-20160316-T2-01 TN012	0.113	0.160	0.162	0.184	0.158	0.195	0.189	0.161	0.182	0.163	0.173	0.179	0.190	0.217	0.153	0.166	0.098	0.180	0.184	0.095	0.165	0.116	0.118	0.121	0.186	0.017		0.014	0.014	0.013	0.017	0.019	0.021	0.021	0.022
CA37 12:0096 Trinemura indet. TN013	0.123	0.148	0.163	0.184	0.174	0.183	0.157	0.165	0.163	0.155	0.155	0.169	0.184	0.207	0.148	0.152	0.155	0.158	0.163	0.147	0.154	0.126	0.123	0.141	0.180	0.114	0.111		0.004	0.015	0.018	0.017	0.019	0.019	0.021
CA39 11:1511 Trinemura indet. TN013	0.126	0.152	0.167	0.187	0.177	0.190	0.163	0.171	0.169	0.161	0.161	0.175	0.181	0.205	0.151	0.157	0.156	0.162	0.167	0.147	0.157	0.129	0.126	0.144	0.187	0.114	0.111	0.008		0.015	0.019	0.017	0.019	0.019	0.022
FL4 TOBRC0011PIT2-1 B TN014	0.098	0.172	0.175	0.210	0.188	0.171	0.180	0.152	0.174	0.162	0.168	0.146	0.215	0.233	0.141	0.159	0.098	0.165	0.159	0.096	0.162	0.097	0.103	0.123	0.177	0.090	0.085	0.106	0.109		0.018	0.019	0.021	0.019	0.021
EXR0983 BHP821 J8 13 Jimblebar W TN015	0.091	0.181	0.177	0.157	0.165	0.204	0.188	0.176	0.187	0.195	0.189	0.184	0.211	0.201	0.150	0.182	0.137	0.179	0.176	0.134	0.175	0.097	0.094	0.142	0.189	0.146	0.143	0.137	0.141	0.128		0.020	0.019	0.020	0.021
CQ13 Trinemura sp. B19 CC0748 TN016	0.174	0.181	0.184	0.197	0.175	0.170	0.140	0.157	0.128	0.132	0.124	0.137	0.204	0.233	0.186	0.146	0.191	0.107	0.099	0.185	0.105	0.188	0.169	0.197	0.149	0.185	0.182	0.163	0.169	0.160	0.186		0.015	0.019	0.020
JIN0182R BHP465 J2 37 Jinaryi TN016	0.136	0.181	0.178	0.156	0.166	0.149	0.137	0.128	0.125	0.122	0.128	0.156	0.197	0.183	0.170	0.125	0.193	0.141	0.145	0.190	0.135	0.154	0.139	0.166	0.122	0.165	0.159	0.133	0.139	0.153	0.168	0.142		0.013	0.016
EXR1136 BHP1364 J8 15 Mudlark TN016	0.181	0.175	0.160	0.177	0.184	0.173	0.157	0.154	0.146	0.148	0.145	0.173	0.184	0.177	0.179	0.142	0.224	0.137	0.138	0.215	0.141	0.190	0.184	0.205	0.125	0.207	0.207	0.168	0.169	0.177	0.191	0.154	0.110		0.021
EXR0524 OB21 OB22 TN016	0.186	0.207	0.192	0.178	0.188	0.181	0.165	0.153	0.163	0.162	0.165	0.193	0.205	0.202	0.198	0.156	0.218	0.135	0.136	0.224	0.145	0.192	0.183	0.183	0.086	0.197	0.197	0.185	0.192	0.182	0.185	0.158	0.121	0.132	

1. Tamura K., Stecher G., Peterson D., Filipski A., and Kumar S. (2013). MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. Molecular Biology and Evolution30: 2725-2729.

The number of base differences per site from between sequences are shown. Standard error estimate(s) are shown above the diagonal. The analysis involved 42 nucleotide sequences. Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair. There were a total of 495 positions in the final dataset. Evolutionary analyses were conducted in MEGA6 [1].

Table 11. Estimates of Evolutionary Divergence between Sequences

Specimen ID	LI31 RC16MEC0177-20170309-02	LI34 RC16MEK0002-20170321-T2-1	LI35 RC16MEK0002-20170321-T3-1	KD24 GR15MEB0014.20160915.T2-01	KD25 RC15MEC0096.20160915.T2-01	KD26 RC16MEC0005.20160915.T1-01	KD27 GR15MEB0022.20160915.T3-02	KD66 GR15MEB0022-20160727-SC-01	KD67 GR15MEB0022-20160727-SC-02	KD69 GR15MEB0022-20160727-SC-04	AX83 10DDH033P1T1-2 PC042	AX85 ID32P1T1-7 PC045	CP3 RC10KOOD0049T2-4 Schizomida CP008	EA0270R Lag B2 Ophthalmia Range PC033	EAP0178 Tyran B1 Ophthalmia Range PC032	EU559505 Paraliochthonius sp. JM-2008	EXR1148 J20-6 Lagy S4 Hancock Range North PC039	G118 Tyrannochthonius Hamersley Range PC021	G328 LN9199 Tyrannochthonius sp Ophthalmia Range PC029	G428 110726 Chthoniidae sp PC031	G429 110960 Chthoniidae sp PC021	G430 100975 Tyrannochthonius sp PC030	GF0173R Lag B2 Jirrpalpur Range PC040	IS01 PC001	IS05 PC005	IS06 PC004	IS08 PC003	IS10 PC006	IS11 PC007	IS12 PC002	IV203 DD14MRR0004T1-04 PC011	IV210 MEARC3814-20150606-02sc PC012	IV212 DD14MEL0001-20151001-T2-02 PC009	IV226 RC14MRR0020-20151002-T2-01 PC010	IV261 GR15MEB0022-20160115-sc-01 Gp 5 PC047	IV268 RC15MEB0171-20160317-T2-02 Gp 1 PC049	IV269 RC15MEB0171-20160317-T3-01 Gp 2 PC050	IV278 127104 Pseudoscopiones Gp 3 PC051	IV279 127105 Pseudoscopiones Gp 4 PC048	JIN0078R BHP772 Lagynochthonius Hancock Range South PC041	JU07 RC15MEH0335.20160627.T1-01 PC015	JU08 GR15MEH0015.20160627.T2-03 PCO14	JV08 DD15BS40010-20160608-T2-02 PC046	KJ659959 Tyrannochthonius aridus
LI31 RC16MEC0177-20170309-02		0.014	0.014	0.015	0.015	0.016	0.017	0.008	0.009	0.008	0.015	0.015	0.016	0.024	0.025	0.021	0.024	0.021	0.017	0.016	0.014	0.016	0.024	0.018	0.019	0.021	0.019	0.022	0.019	0.018	0.020	0.019	0.021	0.020	0.009	0.016	0.016	0.016	0.015	0.025	0.016	0.014	0.019	0.020
LI34 RC16MEK0002-20170321-T2-1	0.201		0.000	0.013	0.016	0.017	0.015	0.015	0.015	0.015	0.015	0.014	0.016	0.022	0.024	0.016	0.022	0.024	0.018	0.016	0.016	0.016	0.025	0.018	0.019	0.020	0.020	0.019	0.019	0.019	0.021	0.019	0.013	0.014	0.015	0.017	0.016	0.016	0.015	0.024	0.013	0.013	0.018	0.019
LI35 RC16MEK0002-20170321-T3-1	0.202	0.000		0.013	0.016	0.017	0.015	0.016	0.015	0.016	0.015	0.014	0.016	0.022	0.024	0.016	0.022	0.024	0.018	0.016	0.016	0.016	0.025	0.018	0.019	0.020	0.020	0.019	0.019	0.019	0.021	0.019	0.013	0.014	0.015	0.017	0.016	0.016	0.015	0.024	0.013	0.013	0.018	0.019
KD24 GR15MEB0014.20160915.T2-01	0.207	0.102	0.102		0.016	0.016	0.015	0.015	0.015	0.015	0.016	0.014	0.016	0.024	0.022	0.017	0.023	0.024	0.020	0.017	0.016	0.016	0.024	0.018	0.017	0.020	0.019	0.020	0.019	0.018	0.021	0.018	0.015	0.017	0.015	0.017	0.015	0.015	0.014	0.025	0.014	0.013	0.019	0.019
KD25 RC15MEC0096.20160915.T2-01	0.238	0.201	0.202	0.191		0.003	0.015	0.015	0.015	0.015	0.016	0.016	0.017	0.022	0.025	0.020	0.023	0.024	0.017	0.018	0.016	0.018	0.025	0.017	0.013	0.015	0.016	0.021	0.019	0.019	0.018	0.018	0.019	0.021	0.015	0.017	0.015	0.016	0.015	0.024	0.016	0.014	0.018	0.022
KD26 RC16MEC0005.20160915.T1-01	0.241	0.206	0.206	0.196	0.004		0.016	0.016	0.015	0.016	0.015	0.016	0.017	0.022	0.025	0.020	0.023	0.024	0.018	0.018	0.016	0.019	0.024	0.017	0.014	0.015	0.016	0.021	0.020	0.019	0.017	0.018	0.020	0.022	0.015	0.017	0.015	0.016	0.015	0.023	0.016	0.015	0.018	0.023
KD27 GR15MEB0022.20160915.T3-02	0.205	0.201	0.201	0.189	0.201	0.204		0.017	0.017	0.017	0.016	0.015	0.016	0.021	0.024	0.020	0.022	0.024	0.020	0.016	0.015	0.017	0.025	0.019	0.017	0.017	0.018	0.021	0.017	0.018	0.019	0.013	0.020	0.021	0.017	0.013	0.010	0.016	0.016	0.024	0.014	0.014	0.021	0.021
KD66 GR15MEB0022-20160727-SC-01	0.061	0.209	0.209	0.197	0.232	0.235	0.202		0.001	0.000	0.016	0.015	0.015	0.025	0.025	0.020	0.024	0.022	0.016	0.016	0.015	0.016	0.024	0.018	0.019	0.020	0.018	0.020	0.019	0.017	0.019	0.020	0.020	0.020	0.002	0.017	0.015	0.016	0.015	0.026	0.016	0.014	0.019	0.020
KD67 GR15MEB0022-20160727-SC-02	0.063	0.207	0.208	0.199	0.231	0.234	0.201	0.001		0.001	0.015	0.015	0.015	0.025	0.025	0.020	0.024	0.022	0.016	0.016	0.015	0.016	0.024	0.017	0.019	0.020	0.018	0.020	0.019	0.017	0.019	0.020	0.019	0.021	0.002	0.017	0.016	0.017	0.015	0.026	0.015	0.014	0.019	0.020
KD69 GR15MEB0022-20160727-SC-04	0.061	0.209	0.209	0.197	0.232	0.235	0.202	0.000	0.001		0.016	0.015	0.015	0.025	0.025	0.020	0.024	0.022	0.016	0.016	0.015	0.016	0.024	0.018	0.019	0.020	0.018	0.020	0.019	0.017	0.019	0.020	0.020	0.020	0.002	0.017	0.015	0.016	0.015	0.026	0.016	0.014	0.019	0.020
AX83 10DDH033P1T1-2 PC042	0.193	0.181	0.182	0.192	0.209	0.206	0.194	0.206	0.205	0.206		0.015	0.016	0.021	0.024	0.017	0.021	0.026	0.020	0.015	0.017	0.016	0.023	0.018	0.021	0.020	0.018	0.021	0.019	0.019	0.021	0.022	0.019	0.021	0.015	0.017	0.016	0.016	0.018	0.025	0.015	0.014	0.020	0.021
AX85 ID32P1T1-7 PC045	0.190	0.191	0.192	0.186	0.219	0.219	0.178	0.189	0.190	0.189	0.180		0.016	0.023	0.024	0.017	0.023	0.025	0.019	0.016	0.018	0.015	0.023	0.020	0.018	0.019	0.019	0.020	0.016	0.019	0.019	0.020	0.019	0.018	0.015	0.016	0.016	0.015	0.015	0.023	0.015	0.014	0.019	0.017
CP3 RC10KOOD0049T2-4 Schizomida CP008	0.193	0.206	0.206	0.207	0.238	0.239	0.213	0.190	0.191	0.190	0.199	0.184		0.021	0.023	0.019	0.022	0.025	0.020	0.018	0.017	0.015	0.020	0.020	0.020	0.021	0.021	0.021	0.020	0.018	0.021	0.021	0.021	0.021	0.015	0.016	0.016	0.016	0.015	0.020	0.016	0.015	0.022	0.021
EA0270R Lag B2 Ophthalmia Range PC033	0.241	0.232	0.232	0.253	0.244	0.244	0.244	0.259	0.259	0.259	0.220	0.232	0.223		0.024	0.021	0.024	0.023	0.021	0.025	0.023	0.022	0.023	0.024	0.022	0.023	0.025	0.024	0.021	0.023	0.019	0.022	0.022	0.025	0.025	0.022	0.022	0.024	0.022	0.020	0.021	0.022	0.022	0.020
EAP0178 Tyran B1 Ophthalmia Range PC032	0.253	0.215	0.215	0.194	0.250	0.250	0.256	0.262	0.262	0.262	0.250	0.256	0.265	0.274		0.022	0.026	0.021	0.023	0.028	0.021	0.025	0.026	0.022	0.024	0.025	0.021	0.027	0.025	0.021	0.024	0.025	0.024	0.025	0.025	0.026	0.025	0.022	0.022	0.025	0.023	0.022	0.024	0.023
EU559505 Paraliochthonius sp. JM-2008	0.197	0.197	0.197	0.215	0.223	0.223	0.177	0.197	0.195	0.197	0.199	0.140	0.188	0.204	0.264		0.021	0.023	0.018	0.019	0.020	0.021	0.021	0.019	0.019	0.019	0.019	0.020	0.016	0.019	0.017	0.021	0.017	0.021	0.020	0.021	0.020	0.019	0.019	0.023	0.017	0.018	0.019	0.018
EXR1148 J20-6 Lagy S4 Hancock Range North PC039	0.219	0.219	0.219	0.222	0.243	0.243	0.231	0.237	0.237	0.237	0.225	0.189	0.192	0.231	0.267	0.206		0.023	0.022	0.022	0.022	0.025	0.025	0.025	0.023	0.024	0.025	0.024	0.021	0.024	0.024	0.021	0.023	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.023	0.024	0.025	0.023
G118 Tyrannochthonius Hamersley Range PC021	0.202	0.276	0.276	0.267	0.273	0.276	0.238	0.208	0.208	0.208	0.243	0.240	0.255	0.277	0.247	0.234	0.219		0.023	0.021	0.006	0.021	0.026	0.022	0.025	0.023	0.024	0.027	0.024	0.023	0.023	0.025	0.026	0.026	0.022	0.023	0.026	0.023	0.024	0.028	0.024	0.024	0.024	0.026
G328 LN9199 Tyrannochthonius sp Ophthalmia Range PC029	0.172	0.187	0.187	0.187	0.199	0.199	0.198	0.178	0.178	0.178	0.199	0.176	0.170	0.202	0.226	0.188	0.178	0.217		0.022	0.020	0.020	0.022	0.019	0.018	0.020	0.020	0.020	0.019	0.017	0.021	0.021	0.020	0.020	0.017	0.021	0.020	0.019	0.018	0.021	0.020	0.019	0.020	0.021
G428 110726 Chthoniidae sp PC031	0.210	0.216	0.217	0.208	0.231	0.228	0.211	0.203	0.205	0.203	0.223	0.199	0.235	0.262	0.279	0.201	0.219	0.150	0.227		0.014	0.014	0.026	0.022	0.021	0.021	0.019	0.019	0.020	0.021	0.021	0.018	0.022	0.021	0.015	0.016	0.016	0.016	0.015	0.029	0.016	0.016	0.019	0.021
G429 110960 Chthoniidae sp PC021	0.204	0.230	0.231	0.224	0.237	0.240	0.213	0.203	0.202	0.203	0.220	0.210	0.241	0.271	0.250	0.212	0.207	0.012	0.195	0.125		0.014	0.027	0.019	0.021	0.020	0.021	0.022	0.021	0.020	0.021	0.021	0.023	0.022	0.015	0.016	0.016	0.016	0.015	0.028	0.016	0.015	0.022	0.023
G430 100975 Tyrannochthonius sp PC030	0.177	0.213	0.213	0.208	0.233	0.234	0.186	0.188	0.189	0.188	0.203	0.169	0.192	0.217	0.276	0.199	0.222	0.199	0.199	0.169	0.172		0.024	0.020	0.019	0.020	0.021	0.019	0.019	0.020	0.021	0.018	0.021	0.020	0.016	0.016	0.014	0.017	0.016	0.024	0.015	0.014	0.021	0.021
GF0173R Lag B2 Jirrpalpur Range PC040	0.217	0.235	0.235	0.226	0.261	0.258	0.235	0.229	0.229	0.229	0.246	0.223	0.185	0.238	0.265	0.210	0.189	0.235	0.155	0.261	0.238	0.205		0.024	0.024	0.025	0.026	0.024	0.021	0.023	0.022	0.024	0.026	0.025	0.024	0.024	0.025	0.024	0.025	0.022	0.018	0.017	0.024	0.025	0.024	0.023
IS01 PC001	0.222	0.196	0.196	0.184	0.140	0.140	0.229	0.231	0.229	0.231	0.212	0.238	0.240	0.259	0.206	0.227	0.240	0.258	0.199	0.234	0.241	0.256	0.258		0.017	0.016	0.014	0.020	0.020	0.011	0.020	0.018	0.018	0.019	0.018	0.020	0.018	0.018	0.019	0.024	0.017	0.018	0.018	0.020
IS05 PC005	0.233	0.196	0.196	0.169	0.107	0.107	0.204	0.247	0.249	0.247	0.220	0.214	0.222	0.274	0.224	0.221	0.246	0.296	0.215	0.232	0.258	0.238	0.264	0.167		0.014	0.018	0.021	0.018	0.016	0.019	0.018	0.020	0.020	0.019	0.020	0.017	0.018	0.020	0.022	0.018	0.018	0.019	0.021
IS06 PC004	0.231	0.204	0.204	0.202	0.138	0.138	0.196	0.244	0.242	0.244	0.216	0.220	0.224	0.256	0.238	0.203	0.249	0.282	0.199	0.216	0.247	0.236	0.273	0.149	0.116		0.016	0.021	0.020	0.016	0.021	0.018	0.020	0.021	0.020	0.020	0.018	0.021	0.021	0.025	0.018	0.019	0.017	0.021
IS08 PC003	0.222	0.207	0.207	0.184	0.129	0.129	0.227	0.224	0.222	0.224	0.229	0.243	0.240	0.268	0.221	0.232	0.246	0.276	0.224	0.232	0.252	0.252	0.267	0.093	0.149	0.136		0.019	0.019	0.015	0.020	0.019	0.019	0.019	0.018	0.021	0.021	0.018	0.018	0.025	0.017	0.018	0.017	0.020
IS10 PC006	0.211	0.227	0.227	0.242	0.220	0.222	0.204	0.200	0.198	0.200	0.223	0.174	0.224	0.253	0.268	0.191	0.228	0.252	0.217	0.223	0.236	0.207	0.238	0.227	0.231	0.258	0.222		0.016	0.020	0.019	0.021	0.019	0.018	0.021	0.022	0.021	0.019	0.017	0.023	0.018	0.020	0.020	0.020
IS11 PC007	0.180	0.189	0.189	0.198	0.200	0.200	0.169	0.191	0.189	0.191	0.189	0.158	0.189	0.241	0.294	0.178	0.225	0.270	0.192	0.234	0.245	0.178	0.194	0.229	0.209	0.227	0.222	0.176		0.020	0.016	0.018	0.019	0.018	0.019	0.018	0.019	0.018	0.017	0.018	0.019	0.019	0.020	0.019
IS12 PC002	0.222	0.198	0.198	0.178	0.149	0.149	0.231	0.220	0.222	0.220	0.225	0.238	0.222	0.250	0.197	0.218	0.240	0.261	0.192	0.243	0.243	0.241	0.249	0.053	0.147	0.147	0.091	0.236	0.233		0.019	0.018	0.019	0.018	0.017	0.021	0.017	0.019	0.017	0.023	0.017	0.018	0.018	0.020
IV203 DD14MRR0004T1-04 PC011	0.184	0.200	0.200	0.222	0.207	0.202	0.158	0.191	0.189	0.191	0.189	0.169	0.182	0.208	0.253	0.167	0.216	0.220	0.180	0.194	0.209	0.194	0.208	0.204	0.236	0.193	0.216	0.200	0.144	0.204		0.018	0.020	0.022	0.019	0.019	0.018	0.018	0.017	0.022	0.018	0.019	0.021	0.019
IV210 MEARC3814-20150606-02sc PC012	0.198	0.218	0.218	0.213	0.196	0.198	0.096	0.207	0.209	0.207	0.212	0.189	0.218	0.235	0.250	0.205	0.207	0.246	0.194	0.198	0.227	0.189	0.235	0.198	0.222	0.216	0.207	0.193	0.187	0.204	0.156		0.020	0.020	0.021	0.014	0.014	0.016	0.017	0.024	0.015	0.016	0.021	0.020
IV212 DD14MEL0001-20151001-T2-02 PC009	0.222	0.076	0.076	0.104	0.202	0.207	0.218	0.236	0.233	0.236	0.194	0.220	0.218	0.253	0.218	0.221	0.234	0.279	0.203	0.247	0.256	0.238	0.255	0.187	0.204	0.187	0.189	0.240	0.193	0.196	0.204	0.218		0.016	0.020	0.020	0.020	0.020	0.019	0.024	0.019	0.019	0.018	0.019
IV226 RC14MRR0020-20151002-T2-01 PC010	0.216	0.102	0.102	0.144	0.198	0.202	0.231	0.229	0.231	0.229	0.194	0.214	0.218	0.256	0.221	0.223	0.234	0.287	0.208	0.238	0.256	0.234	0.249	0.207	0.202	0.189	0.216	0.238	0.193	0.202	0.207	0.238	0.111		0.021	0.021	0.019	0.019	0.021	0.024	0.019	0.018	0.019	0.019
IV261 GR15MEB0022-20160115-sc-01 Gp 5 PC047	0.061	0.209	0.209	0.202	0.228	0.231	0.199	0.004	0.003	0.004	0.202	0.187	0.189	0.259	0.262	0.192	0.237	0.208	0.181	0.202	0.199	0.186	0.229	0.225	0.245	0.238	0.218	0.194	0.185	0.218	0.185	0.205	0.229	0.227		0.017	0.016	0.016	0.015	0.026	0.015	0.014	0.019	0.020
IV268 RC15MEB0171-20160317-T2-02 Gp 1 PC049	0.205	0.215	0.215	0.205	0.219	0.219	0.111	0.216	0.215	0.216	0.205	0.187	0.232	0.232	0.256	0.194	0.237	0.243	0.215	0.218	0.228	0.198	0.243	0.220	0.218	0.212	0.225	0.203	0.180	0.232	0.180	0.111	0.216	0.234	0.212		0.014	0.015	0.016	0.024	0.013	0.013	0.022	0.020
IV269 RC15MEB0171-20160317-T3-01 Gp 2 PC050	0.190	0.202	0.202	0.187	0.202	0.205	0.075	0.187	0.189	0.187	0.200	0.177	0.201	0.232	0.250	0.203	0.228	0.246	0.199	0.211	0.208	0.172	0.235	0.209	0.212	0.220	0.236	0.205	0.194	0.214	0.158	0.085	0.216	0.227	0.186	0.117		0.016	0.016	0.024	0.014	0.013	0.020	0.021
IV278 127104 Pseudoscopiones Gp 3 PC051	0.190	0.199	0.199	0.192	0.228	0.230	0.158	0.195	0.196	0.195	0.196	0.179	0.213	0.235	0.256	0.201	0.207	0.235	0.190	0.212	0.223	0.202	0.214	0.218	0.227	0.227	0.216	0.187	0.156	0.223	0.125	0.143	0.212	0.209	0.193	0.165	0.154		0.012	0.025	0.013	0.012	0.021	0.019
IV279 127105 Pseudoscopiones Gp 4 PC048	0.185	0.204	0.204	0.201	0.220	0.222	0.166	0.182	0.181	0.182	0.203	0.185	0.195	0.238	0.259	0.172	0.225	0.235	0.183	0.210	0.211	0.203	0.185	0.214	0.225	0.218	0.216	0.192	0.151	0.212	0.122	0.163	0.209	0.212	0.178	0.175	0.175	0.104		0.021	0.015	0.013	0.020	0.020
JIN0078R BHP772 Lagynochthonius Hancock Range South PC041	0.264	0.252	0.252	0.261	0.270	0.267	0.223	0.267	0.267	0.267	0.232	0.229	0.208	0.232	0.315	0.207	0.192	0.282	0.191	0.282	0.282	0.226	0.147	0.287	0.284	0.284	0.305	0.243	0.196	0.282	0.185	0.246	0.261	0.252	0.267	0.235	0.229	0.217	0.211		0.025	0.026	0.025	0.021
JU07 RC15MEH0335.20160627.T1-01 PC015	0.183	0.199	0.199	0.191	0.212	0.213	0.157	0.186	0.184	0.186	0.191	0.172	0.210	0.241	0.253	0.173	0.213	0.261	0.176	0.209	0.231	0.172	0.240	0.198	0.218	0.202	0.204	0.187	0.191	0.189	0.158	0.133	0.204	0.229	0.181	0.162	0.157	0.157	0.160	0.243		0.007	0.019	0.017
JU08 GR15MEH0015.20160627.T2-03 PCO14	0.172	0.193	0.193	0.181	0.201	0.204	0.149	0.178	0.177	0.178	0.189	0.178	0.211	0.244	0.253	0.178	0.222	0.261	0.178	0.206	0.224	0.175	0.249	0.200	0.222	0.211	0.207	0.191	0.198	0.196	0.164	0.136	0.211	0.224	0.174	0.159	0.146	0.148	0.154	0.246	0.029		0.020	0.017
JV08 DD15BS40010-20160608-T2-02 PC046	0.211	0.171	0.171	0.187	0.160	0.160	0.200	0.220	0.222	0.220	0.194	0.205	0.213	0.256	0.250	0.212	0.249	0.284	0.201	0.216	0.256	0.238	0.264	0.162	0.162	0.164	0.167	0.218	0.200	0.164	0.189	0.204	0.187	0.184	0.218	0.194	0.187	0.189	0.185	0.279	0.173	0.184		0.019
KJ659959 Tyrannochthonius aridus	0.191	0.157	0.157	0.179	0.216	0.216	0.211	0.211	0.213	0.211	0.189	0.191	0.189	0.214	0.235	0.191	0.237	0.258	0.194	0.238	0.252	0.199	0.232	0.201	0.218	0.216	0.211	0.235	0.181	0.199	0.184	0.208	0.169	0.184	0.213	0.203	0.196	0.191	0.191	0.243	0.186	0.194	0.172	

1. Tamura K., Stecher G., Peterson D., Filipski A., and Kumar S. (2013). MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. Molecular Biology and Evolution30: 2725-2729.

The number of base differences per site from between sequences are shown. Standard error estimate(s) are shown above the diagonal. The analysis involved 42 nucleotide sequences. Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair. There were a total of 495 positions in the final dataset.
Evolutionary analyses were conducted in MEGA6 [1].

Table 14. Estimates of Evolutionary Divergence between Sequences

Specimen ID	LI32 RC16MEC0102-170308-2 Schizomida	LI38 RC16MEA004-20170322-T1-3 Schizomida	LI39 RC16MEA004-20170322-T1-4 Schizomida	C119 ex T95543 SCH018	C37 T92541B SCH016	C58 T98320 SCH017	GH7 Draculoides Dra-PES16433 SCH026	GH8 Draculoides Dra-PES16447 SCH027	HE17 BHRC151-20141216-T3-01c SCH028	HE4 BHRC001-20141028-SC01 SCH029	IS15 KBRC1389 20150909 04 SCH032	IS33 Kbrc116720150809t2 05 SCH031	IT67 BHRC401-151013-T1-01 SCH033	IV07 Budgie20150604-06 SCH002	IV09 DD14MEL0001-t2-01 SCH004a	IV289 110827 SCH001	IV293 140982 SCH034	IV295 133446 SCH036	IV61 DD14MEC0002-20150929-T3-03 SCH001	IV76 MELUNK11-20151001-T2-01 SCH004	IV82 TOBRC0023-20151001-T1-01 SCH003	KD29 GR15MEC0018.20160915.T1-01 Schizomida	KD31 RC15MEB0216.20160915.T3-01 Schizomida	KD36 GR15MEB0009.20160915.T2-01 Schizomida	Panachoretus WAM T66236 Paradraculoides	Pbythius WAM T63344 Paradraculoides byth	Pgnophicola WAM T63371 3 Paradraculoides	Pkryptus WAM T65802 Paradraculoides kryp	Psp OFB 2007 Paradraculoides sp. OFB-200	T93233 C17 CBRC099P5T1-3 Paradraculoides sp cardo
LI32 RC16MEC0102-170308-2 Schizomida		0.010	0.012	0.012	0.015	0.013	0.015	0.014	0.013	0.016	0.014	0.014	0.014	0.009	0.014	0.003	0.011	0.012	0.000	0.013	0.012	0.003	0.003	0.002	0.013	0.002	0.013	0.014	0.011	0.015
LI38 RC16MEA004-20170322-T1-3 Schizomida	0.082		0.008	0.013	0.016	0.016	0.015	0.013	0.014	0.017	0.016	0.015	0.015	0.011	0.013	0.012	0.000	0.010	0.012	0.014	0.011	0.012	0.012	0.011	0.010	0.012	0.013	0.013	0.011	0.015
LI39 RC16MEA004-20170322-T1-4 Schizomida	0.094	0.056		0.014	0.015	0.016	0.015	0.014	0.014	0.017	0.016	0.015	0.013	0.011	0.013	0.014	0.009	0.003	0.013	0.014	0.012	0.014	0.014	0.013	0.004	0.014	0.014	0.014	0.012	0.014
C119 ex T95543 SCH018	0.137	0.149	0.154		0.015	0.015	0.014	0.012	0.013	0.013	0.014	0.013	0.013	0.012	0.014	0.012	0.012	0.013	0.012	0.014	0.013	0.012	0.012	0.012	0.013	0.012	0.014	0.013	0.013	0.016
C37 T92541B SCH016	0.144	0.140	0.144	0.156		0.013	0.014	0.013	0.013	0.013	0.014	0.012	0.015	0.014	0.013	0.015	0.014	0.013	0.015	0.013	0.013	0.014	0.014	0.014	0.013	0.014	0.014	0.014	0.012	0.015
C58 T98320 SCH017	0.105	0.133	0.144	0.141	0.120		0.014	0.015	0.012	0.013	0.013	0.012	0.014	0.014	0.014	0.014	0.015	0.016	0.013	0.016	0.013	0.013	0.013	0.013	0.016	0.013	0.013	0.013	0.013	0.014
GH7 Draculoides Dra-PES16433 SCH026	0.146	0.137	0.139	0.135	0.138	0.133		0.007	0.013	0.014	0.016	0.015	0.014	0.014	0.015	0.015	0.013	0.013	0.015	0.016	0.014	0.016	0.015	0.015	0.013	0.015	0.014	0.016	0.015	0.014
GH8 Draculoides Dra-PES16447 SCH027	0.146	0.126	0.124	0.119	0.141	0.130	0.038		0.014	0.014	0.015	0.014	0.013	0.013	0.013	0.014	0.012	0.014	0.014	0.014	0.013	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.015
HE17 BHRC151-20141216-T3-01c SCH028	0.126	0.140	0.137	0.148	0.115	0.118	0.137	0.137		0.014	0.013	0.013	0.012	0.012	0.013	0.014	0.013	0.014	0.013	0.013	0.012	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.015
HE4 BHRC001-20141028-SC01 SCH029	0.137	0.145	0.149	0.144	0.121	0.118	0.145	0.145	0.115		0.013	0.012	0.012	0.016	0.015	0.016	0.016	0.015	0.016	0.014	0.014	0.016	0.016	0.016	0.014	0.015	0.015	0.014	0.015	0.015
IS15 KBRC1389 20150909 04 SCH032	0.124	0.135	0.139	0.138	0.135	0.109	0.152	0.144	0.124	0.124		0.012	0.012	0.013	0.013	0.014	0.015	0.015	0.014	0.013	0.012	0.014	0.013	0.014	0.015	0.014	0.012	0.014	0.013	0.014
IS33 Kbrc116720150809t2 05 SCH031	0.121	0.128	0.125	0.124	0.114	0.108	0.138	0.122	0.104	0.099	0.100		0.013	0.013	0.013	0.015	0.013	0.014	0.014	0.013	0.014	0.014	0.014	0.013	0.014	0.014	0.014	0.013	0.014	0.015
IT67 BHRC401-151013-T1-01 SCH033	0.116	0.131	0.117	0.130	0.132	0.113	0.139	0.127	0.115	0.110	0.099	0.105		0.014	0.013	0.015	0.013	0.012	0.014	0.013	0.013	0.014	0.015	0.014	0.013	0.015	0.014	0.014	0.012	0.015
IV07 Budgie20150604-06 SCH002	0.069	0.070	0.078	0.130	0.127	0.119	0.131	0.121	0.129	0.138	0.122	0.124	0.114		0.011	0.009	0.011	0.011	0.009	0.012	0.009	0.009	0.009	0.009	0.011	0.009	0.010	0.012	0.010	0.013
IV09 DD14MEL0001-t2-01 SCH004a	0.117	0.105	0.114	0.143	0.127	0.130	0.139	0.136	0.124	0.143	0.127	0.130	0.121	0.108		0.015	0.012	0.013	0.014	0.008	0.012	0.014	0.015	0.014	0.014	0.014	0.012	0.012	0.012	0.015
IV289 110827 SCH001	0.008	0.084	0.105	0.132	0.146	0.108	0.146	0.142	0.129	0.137	0.131	0.122	0.121	0.070	0.122		0.011	0.012	0.003	0.014	0.012	0.003	0.000	0.003	0.013	0.003	0.014	0.014	0.012	0.015
IV293 140982 SCH034	0.086	0.000	0.058	0.141	0.133	0.127	0.136	0.125	0.137	0.143	0.131	0.125	0.125	0.074	0.102	0.085		0.009	0.011	0.012	0.011	0.011	0.011	0.011	0.009	0.011	0.012	0.012	0.010	0.015
IV295 133446 SCH036	0.108	0.060	0.010	0.144	0.139	0.142	0.138	0.128	0.135	0.143	0.135	0.128	0.114	0.078	0.116	0.110	0.056		0.012	0.014	0.011	0.012	0.012	0.012	0.003	0.012	0.014	0.013	0.011	0.014
IV61 DD14MEC0002-20150929-T3-03 SCH001	0.000	0.086	0.104	0.137	0.144	0.105	0.146	0.146	0.126	0.137	0.124	0.121	0.116	0.069	0.117	0.008	0.086	0.108		0.013	0.012	0.003	0.003	0.002	0.013	0.002	0.013	0.014	0.011	0.015
IV76 MELUNK11-20151001-T2-01 SCH004	0.102	0.109	0.120	0.130	0.129	0.132	0.139	0.130	0.127	0.134	0.122	0.121	0.111	0.111	0.034	0.103	0.105	0.119	0.102		0.012	0.014	0.014	0.013	0.014	0.014	0.013	0.011	0.011	0.015
IV82 TOBRC0023-20151001-T1-01 SCH003	0.081	0.077	0.088	0.146	0.133	0.119	0.136	0.135	0.123	0.129	0.124	0.119	0.116	0.063	0.110	0.086	0.080	0.088	0.081	0.107		0.012	0.012	0.012	0.012	0.012	0.009	0.012	0.008	0.013
KD29 GR15MEC0018.20160915.T1-01 Schizomida	0.005	0.088	0.105	0.138	0.139	0.103	0.150	0.147	0.131	0.138	0.121	0.117	0.121	0.070	0.122	0.009	0.088	0.110	0.005	0.107	0.086		0.003	0.003	0.013	0.002	0.013	0.014	0.011	0.015
KD31 RC15MEB0216.20160915.T3-01 Schizomida	0.008	0.084	0.105	0.132	0.141	0.106	0.146	0.142	0.129	0.137	0.129	0.118	0.121	0.070	0.122	0.000	0.085	0.110	0.008	0.103	0.086	0.010		0.003	0.013	0.003	0.014	0.014	0.012	0.015
KD36 GR15MEB0009.20160915.T2-01 Schizomida	0.003	0.082	0.100	0.133	0.138	0.105	0.146	0.142	0.126	0.137	0.126	0.118	0.119	0.066	0.117	0.005	0.083	0.105	0.003	0.102	0.081	0.007	0.006		0.013	0.001	0.013	0.013	0.011	0.015
Panachoretus WAM T66236 Paradraculoides	0.113	0.063	0.010	0.150	0.142	0.150	0.140	0.132	0.141	0.147	0.142	0.129	0.121	0.085	0.121	0.115	0.063	0.005	0.113	0.124	0.095	0.115	0.115	0.110		0.013	0.014	0.014	0.011	0.015
Pbythius WAM T63344 Paradraculoides byth	0.002	0.087	0.105	0.137	0.140	0.108	0.148	0.147	0.128	0.137	0.127	0.118	0.119	0.069	0.119	0.006	0.087	0.110	0.002	0.103	0.085	0.003	0.006	0.002	0.111		0.013	0.013	0.011	0.015
Pgnophicola WAM T63371 3 Paradraculoides	0.100	0.108	0.113	0.134	0.116	0.118	0.152	0.139	0.123	0.131	0.121	0.111	0.116	0.087	0.095	0.105	0.102	0.116	0.100	0.090	0.076	0.105	0.105	0.103	0.121	0.102		0.012	0.010	0.014
Pkryptus WAM T65802 Paradraculoides kryp	0.110	0.088	0.113	0.148	0.123	0.123	0.142	0.132	0.111	0.132	0.127	0.111	0.108	0.102	0.100	0.111	0.087	0.113	0.110	0.095	0.111	0.111	0.111	0.106	0.118	0.108	0.092		0.011	0.015
Psp OFB 2007 Paradraculoides sp. OFB-200	0.089	0.081	0.084	0.147	0.119	0.121	0.145	0.145	0.121	0.132	0.126	0.121	0.111	0.074	0.103	0.094	0.084	0.089	0.089	0.097	0.039	0.094	0.094	0.089	0.094	0.090	0.084	0.098		0.013
T93233 C17 CBRC099P5T1-3 Paradraculoides sp cardo	0.123	0.119	0.119	0.161	0.130	0.106	0.139	0.125	0.121	0.135	0.116	0.114	0.105	0.117	0.126	0.132	0.119	0.119	0.123	0.134	0.125	0.128	0.132	0.126	0.119	0.123	0.115	0.112	0.114	

1. Tamura K., Stecher G., Peterson D., Filipski A., and Kumar S. (2013). MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. Molecular Biology and Evolution30: 2725-2729.

The number of base differences per site from between sequences are shown. Standard error estimate(s) are shown above the diagonal. The analysis involved 42 nucleotide sequences. Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair. There were a total of 495 positions in the final dataset. Evolutionary analyses were conducted in MEGA6 [1].

Appendix 3

Desktop Analysis Results and Study Comparisons

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa A	Araneae	Oonopidae	*Prethopalpus scanloni*	1	Morphological	MEARC4279	2016	
Mesa A	Araneae	Pholcidae	*Trichocyclus* sp. 'Mesa A'	1	Morphological	MEADC2493	2005	
Mesa A	Araneae	Indeterminate	Araneae sp. 'indet'	1	Morphological	MEADC2517A	2005	
Mesa A	Araneae	Indeterminate	Araneae sp. 'indet'	1	Morphological	MEARC4283	2012	
Mesa A	Araneae	Indeterminate	Araneae sp. 'indet'	1	Morphological	MEARC4305	2012	
Mesa A	Pseudoscorpiones	Chthoniidae	Chthoniidae sp. 'indet'	1	Morphological	MEARC4279	2012	
Mesa A	Pseudoscorpiones	Chthoniidae	*Lagynochthonius asema*	1	Morphological	MEA4026	2007	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Chthoniidae	*Lagynochthonius asema*	1	Morphological	MEA4306	2007	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Chthoniidae	*Lagynochthonius asema*	1	Morphological	MEARC4278	2014	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Chthoniidae	*Lagynochthonius asema*	2	Morphological	MEARC4284	2014	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Chthoniidae	*Lagynochthonius asema*	1	Morphological	MEARC4287	2016	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Chthoniidae	*Lagynochthonius asema*	1	Morphological	MEARC4292	2012	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Chthoniidae	*Lagynochthonius asema*	1	Morphological	MEARC4296	2014	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Chthoniidae	*Tyrannochthonius aridus*	1	Morphological	MEARC4296	2006	
Mesa A	Pseudoscorpiones	Chthoniidae	*Tyrannochthonius* sp. 'indet'	1	Morphological	MEARC4047	2005	
Mesa A	Pseudoscorpiones	Chthoniidae	*Tyrannochthonius* sp. 'Mesa A'	1	Morphological	MEA4476	2007	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus linnaei*	1	Morphological	MEA4316	2007	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus linnaei*	1	Morphological	MEARC2927	2014	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus linnaei*	1	Morphological	MEARC4018	2014	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus linnaei*	1	Morphological	MEARC4281	2014	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. 'indet'	1	Morphological	MEARC2856	2005	

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa A	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. 'indet'	1	Morphological	MEARC2927	2012	
Mesa A	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. 'indet'	1	Morphological	MEARC4284	2006	
Mesa A	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. 'indet'	1	Morphological	MEARC4290	2012	
Mesa A	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. 'indet'	1	Morphological	MEARC4291	2012	
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus* sp. 'Mesa A'	1	Morphological	MEA2988	2007	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus* sp. 'Mesa A'	1	Morphological	MEA4063	2007	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus* sp. 'Mesa A'	1	Morphological	MEA2856	2005	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus* sp. 'Mesa A'	1	Morphological	MEA2988	2007	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus* sp. 'Mesa A'	1	Morphological	MEARC4063	2007	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus* sp. 'Mesa A'	1	Morphological	MEARC4301	2016	Conservation Significant, Listed as Priority 1 in WA
Mesa A	Pseudoscorpiones	Syarinidae	*Ideoblothrus* sp. 'Mesa A2'	1	Morphological	MEARC4038	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	A1149	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA11	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA2504	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEA2827	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA2828	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA2927	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEA2927	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA2988	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological	MEA3092	2007	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
					and Molecular			Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4026	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4026	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4027	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	5	Morphological and Molecular	MEA4144	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEA4150	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4151	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4151	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4151	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEA4155	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4284	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4284	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEA4296	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4306	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEA4307	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2492	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2492	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological	MEADC2497	2005	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
					and Molecular			Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2500	2003	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2501	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2501	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2501	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEADC2501	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2501	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2501	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2501	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2517A	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2517A	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2517A	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2517A	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2582	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2582	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC2582	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEADC3188	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'SCH034'	1	Molecular	MEADC4151	2014	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
								Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC2497	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC2497	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC2582	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	5	Morphological and Molecular	MEARC2611	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC2702	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC2740	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEARC2858	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC2934	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC3066	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC3073	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'SCH034'	1	Molecular	MEARC4018	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4018	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEARC4018	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4018	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4018	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4018	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological	MEARC4026	2006	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
					and Molecular			Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4151	2005	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEARC4280	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4281	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEARC4283	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4284	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4284	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4284	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4290	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4290	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4290	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4290	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	3	Morphological and Molecular	MEARC4291	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	4	Morphological and Molecular	MEARC4291	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4291	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	4	Morphological and Molecular	MEARC4291	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4292	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological	MEARC4293	2012	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
					and Molecular			Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	4	Morphological and Molecular	MEARC4293	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4293	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4294	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4294	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4295	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4295	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	3	Morphological and Molecular	MEARC4296	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4299	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4304	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4304	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	3	Morphological and Molecular	MEARC4305	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	Morphological and Molecular	MEARC4306	2006	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	2	Morphological and Molecular	MEARC4422	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEADC2517a	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	4	Morphological	MEADC4151	2016	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC2740	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	3	Morphological	MEARC2740	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	2	Morphological	MEARC2927	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	2	Morphological	MEARC3042	2005	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC3042	2005	

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4038	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4278	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4279	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4280	2016	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4280	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	2	Morphological	MEARC4281	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	3	Morphological	MEARC4281	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4283	2016	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4284	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4290	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4292	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4293	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4294	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4294	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	5	Morphological	MEARC4296	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4296	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	2	Morphological	MEARC4296	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4298	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4299	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	2	Morphological	MEARC4299	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4301	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MEARC4304	2012	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MOB3a	2016	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MOB3b	2016	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'indet'	1	Morphological	MOB3b	2016	
Mesa A	Schizomida	Hubbardiidae	*Paradraculoides* sp. 'SCH034'	1	Molecular	RC16MEA004	2016	
Mesa A	Scolopendrida	Cryptopidae	*Cryptops* sp. 'indet'	1	Morphological	MEADC2497	2003	
Mesa A	Scolopendrida	Cryptopidae	*Cryptops* sp. 'indet'	1	Morphological	MEARC2858	2005	
Mesa A	Scolopendrida	Cryptopidae	*Cryptops* sp. 'indet'	1	Morphological	MEARC4284	2006	
Mesa A	Scolopendrida	Cryptopidae	*Cryptops* sp. 'indet'	1	Morphological	MEARC4285	2006	
Mesa A	Scolopendrida	Cryptopidae	*Cryptops* sp. 'indet'	1	Morphological	MEARC4296	2006	

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa A	Scolopendrida	Cryptopidae	*Cryptops* sp. 'indet'	1	Morphological	MEARC4307	2006	
Mesa A	Scolopendrida	Cryptopidae	*Cryptops* sp. 'nov'	2	Morphological	MEADC2500	2003	
Mesa A	Scolopendrida	Indeterminate	Scolopendrida sp. 'indet'	1	Morphological	MEARC2560	2005	
Mesa A	Scolopendrida	Indeterminate	Scolopendrida sp. 'indet'	1	Morphological	MEARC3073	2005	
Mesa A	Scolopendrida	Indeterminate	Scolopendrida sp. 'indet'	1	Morphological	MEARC4016	2005	
Mesa A	Polydesmida	Haplodesmidae	Haplodesmidae sp. 'indet'	1	Morphological	MEA4296	2007	
Mesa A	Polydesmida	Haplodesmidae	Haplodesmidae nov. gen. sp. '1'	1	Morphological	MEADC2497	2003	
Mesa A	Polyxenida	Indeterminate	Polyxenida sp. 'indet'	6	Morphological	MEA2513	2007	
Mesa A	Polyxenida	Indeterminate	Polyxenida sp. 'indet'	1	Morphological	MEA2513	2007	
Mesa A	Polyxenida	Indeterminate	Polyxenida sp. 'indet'	28	Morphological	MEA2513	2007	
Mesa A	Polyxenida	Indeterminate	Polyxenida sp. 'indet'	1	Morphological	MEA4318	2007	
Mesa A	Polyxenida	Indeterminate	Polyxenida sp. 'indet'	1	Morphological	MEA4318	2007	
Mesa A	Polyxenida	Indeterminate	Polyxenida sp. 'indet'	1	Morphological	MEA2999	2007	
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	7	Morphological	MEARC4026	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	7	Morphological	MEARC4282	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	1	Morphological	MEARC4296	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	2	Morphological	MEARC4298	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	1	Morphological	MEARC4298	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	5	Morphological	MEARC4299	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	2	Morphological	MEARC4301	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	7	Morphological	MEARC4301	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	20	Morphological	MEARC4303	2012	Widespread

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	10	Morphological	MEARC4303	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	Lophoproctidae sp. 'indet'	4	Morphological	MEARC4303	2012	Widespread
Mesa A	Polyxenida	Lophoproctidae	*Lophoturus madecassus*	1	Morphological	MEARC4281	2016	Widespread
Mesa A	Polyxenida	Lophoproctidae	*Lophoturus madecassus*	1	Morphological	MEARC4304	2016	Widespread
Mesa A	Diplura	Campodeidae	Campodeidae sp. 'nov. gen.'	1	Morphological	MEARC2656	2005	
Mesa A	Diplura	Campodeidae	Campodeidae sp. 'OES3'	1	Morphological	MEARC4279	2014	
Mesa A	Diplura	Japygidae	Japygidae sp. 'indet'	1	Morphological	MEADC2496	2005	
Mesa A	Diplura	Japygidae	Japygidae sp. 'indet'	1	Morphological	MEADC2497	2003	
Mesa A	Diplura	Japygidae	*Japyx* sp. 'indet'	1	Morphological	MEARC2740	2005	
Mesa A	Diplura	Projapygidae	Projapygidae sp. 'nov. gen.'	1	Morphological	MEA4318	2007	
Mesa A	Diplura	Propjapygidae	Projapygidae sp. 'nov. gen.'	1	Morphological	MEARC4024	2005	
Mesa A	Diplura	Indeterminate	Diplura sp. 'indet'	1	Morphological	MEARC2702	2005	
Mesa A	Blattodea	Nocticolidae	*Nocticola* sp. 'indet'	1	Morphological	MEARC4018	2016	Widespread
Mesa A	Blattodea	Nocticolidae	*Nocticola* sp. 'OES11'	1	Morphological	MEARC4305	2014	Widespread
Mesa A	Blattodea	Nocticolidae	*Nocticola* sp. 'OES11'	1	Morphological	MEARC4305	2014	Widespread
Mesa A	Blattodea	Indeterminate	Blattodea sp. 'indet'	1	Morphological	MEARC4294	2012	Widespread
Mesa A	Blattodea	Indeterminate	Blattodea sp. 'indet'	2	Morphological	MEARC4304	2012	Widespread
Mesa A	Coleoptera	Curculionidae	Curculionidae sp. 'B02'	1	Morphological	MEARC4279	2016	
Mesa A	Coleoptera	Curculionidae	Curculionidae sp. 'B02'	1	Morphological	MEARC4297	2016	
Mesa A	Coleoptera	Curculionidae	Curculionidae sp. 'OES10'	4	Morphological	MEARC4294	2014	
Mesa A	Coleoptera	Curculionidae	Curculionidae sp. 'OES10'	1	Morphological	MEARC4304	2014	
Mesa A	Coleoptera	Staphylinidae	Staphylinidae sp. 'indet'	9	Morphological	MEA4155	2007	
Mesa A	Coleoptera	Staphylinidae	Staphylinidae sp. 'MesaKOES2'	1	Morphological	MEARC4297	2014	
Mesa A	Coleoptera	Indeterminate	Coleoptera sp. 'indet'	1	Morphological	MEARC4038	2006	
Mesa A	Thysanura	Indet.	Thysanura sp. 'Indet'	1	Morphological	MEA2513	2007	
Mesa A	Thysanura	Nicoletiidae	Nicoletiidae sp. 'indet'	1	Morphological	MEADC4151	2016	
Mesa A	Thysanura	Nicoletiidae	Nicoletiidae sp. 'indet'	1	Morphological	MEARC4305	2016	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 1'	1	Morphological	MEADC2496	2005	

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 1'	1	Morphological	MEADC2501	2005	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 1'	1	Morphological	MEADC2517A	2005	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 1'	1	Morphological	MEADC2523	2005	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 1'	1	Morphological	MEADC2582	2005	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 1'	1	Morphological	MEARC3098	2005	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 1'	1	Morphological	MEARC3098	2005	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 2'	1	Morphological	MEARC4296	2006	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 2'	3	Morphological	MEARC4296	2006	
Mesa A	Thysanura	Nicoletiidae	*Trinemura* sp. 'nov. Mesa A 2'	1	Morphological	MEARC4305	2006	
Mesa A	Isopoda	Armadillidae	Armadillidae sp. 'MesaAOES19'	1	Morphological	MEARC4293	2014	
Mesa A	Isopoda	Oniscidae	*Hanoniscus* sp. 'MesaAOES22'	1	Morphological	MEARC4290	2014	
Mesa A	Isopoda	Oniscidae	*Hanoniscus* sp. 'MesaAOES22'	1	Morphological	MEARC4299	2014	
Mesa A	Isopoda	Oniscidae	*Hanoniscus* sp. 'MesaAOES22'	3	Morphological	MEARC4304	2014	
Mesa A	Isopoda	Indeterminate	Isopoda sp. 'indet'	1	Morphological	MEADC2517a	2012	
Mesa A	Isopoda	Indeterminate	Isopoda sp. 'indet'	1	Morphological	MEARC4281	2012	
Mesa A	Isopoda	Indeterminate	Isopoda sp. 'indet'	1	Morphological	MEARC4295	2012	
Mesa A	Isopoda	Indeterminate	Isopoda sp. 'indet'	1	Morphological	MEARC4295	2012	
Mesa A	Isopoda	Indeterminate	Isopoda sp. 'indet'	1	Morphological	MEARC4303	2012	
Mesa K	Araneae	Micropholcommatidae	Micropholcommatidae sp. 'WAMARA001'	1	Morphological	MEKRC1703	2014	
Mesa K	Blattodea	Nocticolidae	Nocticola sp. 'OES11'	1	Morphological	K0989	2014	
Mesa K	Blattodea	Nocticolidae	Nocticola sp. 'OES11'	1	Morphological	K0996	2014	
Mesa K	Blattodea	Nocticolidae	Nocticola sp. 'OES11'	1	Morphological	MEK1718	2014	
Mesa K	Blattodea	Nocticolidae	Nocticola sp. 'OES11'	1	Morphological	MEK1731	2014	
Mesa K	Blattodea	Nocticolidae	Nocticola sp. 'OES11'	1	Morphological	K0740	2015	
Mesa K	Blattodea	Nocticolidae	Nocticola sp. 'OES11'	1	Morphological	K0996	2015	
Mesa K	Blattodea	Nocticolidae	Nocticola sp. 'OES11'	1	Morphological	K0996	2016	
Mesa K	Coleoptera	Curculionidae	Curculionidae gen. nov. sp. 'B01'	1	Morphological	MEK1486	2015	
Mesa K	Coleoptera	Curculionidae	Cryptorhynchinae sp. 'B04'	1	Morphological	MEK1478	2016	
Mesa K	Coleoptera	Curculionidae	Cryptorhynchinae sp. 'B04'	1	Morphological	MEK1486	2015	
Mesa K	Coleoptera	Curculionidae	Curculionidae sp. 'OES10'	1	Morphological	MEK1486	2014	

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa K	Coleoptera	Ptiliidae	*Ptinella* sp. 'B01'	4	Morphological	MEK1718	2015	
Mesa K	Coleoptera	Ptiliidae	*Ptinella* sp. 'B01'	5	Morphological	MEK1718	2015	
Mesa K	Coleoptera	Ptiliidae	*Ptinella* sp. 'B01'	4	Morphological	MEK1735	2016	
Mesa K	Diplura	Japygidae	Heterojapyx sp. 'nov'	1	Morphological	MEK1478	2006	
Mesa K	Isopoda	Oniscidae	Hanoniscus sp. '1'	1	Morphological	MEK1337	2010	
Mesa K	Isopoda	Oniscidae	Hanoniscus sp. '1'	1	Morphological	MEK1074	2013	
Mesa K	Isopoda	Oniscidae	Hanoniscus sp. '1'	1	Morphological	MEK1486	2013	
Mesa K	Isopoda	Oniscidae	Hanoniscus sp. '1'	1	Morphological	MEK1074	2016	
Mesa K	Isopoda	Philosciidae	*Andricophiloscia* sp. 'B19'	1	Morphological	K0739	2015	
Mesa K	Polydesmida	Dalodesmidae	Dalodesmidae sp. 'B08'	5	Morphological	MEK1703	2015	
Mesa K	Polydesmida	Dalodesmidae	Dalodesmidae sp. 'B08'	2	Morphological	MEK1609	2015	
Mesa K	Polydesmida	Dalodesmidae	Dalodesmidae sp. 'B08'	24	Morphological	MEK1703	2015	
Mesa K	Polydesmida	Dalodesmidae	Dalodesmidae sp. 'B08'	3	Morphological	MEK1703	2016	
Mesa K	Polydesmida	Indeterminate	Polydesmida sp. 'indet'	1	Morphological	MEK1712	2011	
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1712	2011	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	2	Morphological	MEK1718	2011	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1718	2011	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	2	Morphological	MEK1731	2011	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1731	2011	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1478	2011	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	K0502	2014	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	K0502	2014	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1486	2014	Widespread
Mesa K	Polyxenida	Lophoproctida	Lophoturus madecassus	3	Morphological	K0607	2014	Widespread

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
		e						
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	K0989	2014	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	6	Morphological	MEK1486	2014	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	2	Morphological	MEK1486	2014	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1718	2014	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	12	Morphological	MEK1731	2014	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	3	Morphological	MEK1703	2015	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1703	2015	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1731	2015	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	K0672	2016	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	3	Morphological	K0996	2016	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	5	Morphological	MEK1478	2016	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1558	2016	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	8	Morphological	MEK1712	2016	Widespread
Mesa K	Polyxenida	Lophoproctidae	Lophoturus madecassus	1	Morphological	MEK1731	2016	Widespread
Mesa K	Pseudoscorpiones	Atemnidae	Oratemnus sp. 'PSE081'	1	Morphological	MEK1735	2013	
Mesa K	Pseudoscorpiones	Atemnidae	Oratemnus sp. 'PSE081'	1	Morphological	K0996	2013	
Mesa K	Pseudoscorpiones	Atemnidae	Oratemnus sp. 'PSE081'	1	Morphological	K1074	2014	
Mesa K	Pseudoscorpiones	Atemnidae	Paratemnoides sp. 'indet'	1	Morphological	k0607	2007	
Mesa K	Pseudoscorpiones	Chthoniidae	Lagynochthonius sp. 'Mesa K'	1	Morphological	MEK1689	2006	

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa K	Pseudoscorpiones	Chthoniidae	Lagynochthonius sp. 'Mesa K'	1	Morphological	MEK1685	2007	
Mesa K	Pseudoscorpiones	Chthoniidae	Lagynochthonius sp. 'Mesa K'	1	Morphological	MEK1735	2011	
Mesa K	Pseudoscorpiones	Chthoniidae	Lagynochthonius sp. 'Mesa K'	1	Morphological	MEK1731	2014	
Mesa K	Pseudoscorpiones	Hyidae	Indohya sp. 'Mesa K'	1	Morphological	MEK1696	2006	
Mesa K	Pseudoscorpiones	Hyidae	Indohya sp. 'Mesa K'	1	Morphological	K0740	2011	
Mesa K	Pseudoscorpiones	Hyidae	Indohya sp. 'Mesa K'	1	Morphological	MEK1558	2013	
Mesa K	Pseudoscorpiones	Hyidae	Indohya sp. 'Mesa K'	1	Morphological	MEK1558	2013	
Mesa K	Pseudoscorpiones	Hyidae	Indohya sp. 'Mesa K'	1	Morphological	K0502	2014	
Mesa K	Pseudoscorpiones	Hyidae	Indohya sp. 'Mesa K'	1	Morphological	K0607	2014	
Mesa K	Pseudoscorpiones	Olpiidae	Linnaeolpium linnaei	1	Morphological	K0502	2007	
Mesa K	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. 'indet'.	1	Morphological	K0996	2012	
Mesa K	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. 'nov'	1	Morphological	MEK1721	2006	
Mesa K	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. ‘Mesa K'	1	Morphological	MEK1685A	2010	
Mesa K	Pseudoscorpiones	Syarinidae	Ideoblothrus sp. ‘Mesa K'	1	Morphological	K0996	2013	
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K0502	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	5	Morphological	K0502	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0502	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K0502	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	5	Morphological	k0607	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	k0607	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0607	2011	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K0607	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	K0607	2013	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0607	2014	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
								Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0607	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0607	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0607	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	K0672	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K0672	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K0672	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0739	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0740	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K0740	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K0740	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0948	2011	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0968	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0968	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0989	2011	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K0989	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0989	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K0996	2016	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
								Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K1074	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	5	Morphological	K1074	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	K1328	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K1328	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	K1337	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	MEK0672	2010	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK0739	2010	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	MEK1337	2010	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1478	2011	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1478	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1478	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	MEK1478	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1486	2013	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1486	2013	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1486	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1486	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	MEK1558	2014	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
								Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	MEK1558	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	MEK1558	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1570A	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1685	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1685	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1685	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	MEK1685	2010	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	4	Morphological	MEK1685A	2010	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	MEK1689A	2010	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1689A	2011	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1689A	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	MEK1696	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	4	Morphological	MEK1697	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1697	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	MEK1697	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	MEK1697	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1702	2011	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
								Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1703	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	MEK1712	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1712	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	2	Morphological	MEK1712	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	3	Morphological	MEK1712	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1712	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1718	2007	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1718	2013	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1724	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1728	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1731	2012	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1731	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	5	Morphological	MEK1731	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1732	2015	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1735	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	6	Morphological	MEK1735	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1735A	2010	Conservation Significant,

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
								Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEK1735A	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	8	Morphological	MEK1735A	2016	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	*Paradraculoides kryptus*	1	Morphological	MEKRC1703	2014	Conservation Significant, Listed as Schedule 3 in WA
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K0557	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K1068	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1685	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1697	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K0607	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K1066	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K1068	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K1074	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	2	Morphological	MEK1703	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1689A	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	3	Morphological	MEK1718	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1721	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1724	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1731	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	2	Morphological	MEK1735	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	2	Morphological	MEK1735A	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1609	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1570	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	3	Morphological	K1598	2011	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	4	Morphological	K1337	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K0672	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K0607	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	3	Morphological	K0672	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K1074	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K1074	2012	

Area	Order	Family	Species Names	Number	Identification Method	Drillhole	Date	Species Status / Notes
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	2	Morphological	MEK1712	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	3	Morphological	MEK1721	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1732	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1732	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	2	Morphological	MEK1735	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1735a	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	2	Morphological	MEK1735a	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K0502	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K0740	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K0989	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	K0996	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	4	Morphological	MEK1558	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	MEK1609	2012	
Mesa K	Schizomida	Hubbardiidae	Paradraculoides sp. 'indet'	1	Morphological	OPK01	2012	
Mesa K	Scolopendrida	Cryptoptidae	Cryptops sp. '1'	1	Morphological	MEK1302	2007	
Mesa K	Scolopendromorpha	Cryptopidae	Cryptops sp. '1'	1	Morphological	K0502	2013	
Mesa K	Scolopendromorpha	Cryptopidae	Cryptops sp. '1'	1	Morphological	MEK1731	2013	
Mesa K	Scolopendromorpha	Cryptopidae	Cryptops sp. 'B47'	1	Morphological	MEK1735	2016	
Mesa K	Scolopendromorpha	Scolopendridae	Scolopendridae sp. 'B03'	1	Morphological	K0502	2015	
Mesa K	Spirobolida	Indeterminate	Spirobolida sp. 'indet'	1	Morphological	K0502	2011	
Mesa K	Thysanura	Indeterminate	Thysanura sp. 'indet'	1	Morphological	MEK1731	2011	
Mesa K	Indeterminate	Indeterminate	Ballophilus australiae	1	Morphological	MEK1731	2016	Widespread
Mesa K	Indeterminate	Indeterminate	Symphyla sp. 'Indet'	1	Morphological	MEK1731	2006	

Appendix 4

Recorded Fauna

Phase	Drillhole	Easting	Northing	Order	Family	Species	N	WAM ID	Identified	Notes / Specimen Status
Mesa A										
P2	RC16MEA004	385836	7604623	Schizomida	Hubbardiidae	Paradraculoides sp. 'SCH034'	1	T144230	Molecular Analysis	Potential SRE Species
P2	RC16MEA004	385836	7604623	Schizomida	Hubbardiidae	Paradraculoides sp. 'SCH034'	1	T144232	Molecular Analysis	Potential SRE Species
P2	RC16MEA004	385836	7604623	Schizomida	Hubbardiidae	Paradraculoides sp. 'SCH034'	1	T144231	Molecular Analysis	Potential SRE Species
P2	RC16MEA004	385836	7604623	Schizomida	Hubbardiidae	*Paradraculoides anachoretus*	1	T144233	Molecular Analysis	Conservation Significant, Listed as Schedule 3 in WA
P2	RC16MEA008	385934	7603716	Blattodea	Indeterminate	Blattodea sp. 'indet'	1	-	Morphology	Surface fauna; Eyes and pigment present
Mesa K										
P2	RC16MEK0002	423800	7597741	Pseudoscorpiones	Chthoniidae	Chthoniidae sp. 'PC059'	1	T144225	Molecular Analysis	Surface fauna
P2	RC16MEK0002	423800	7597741	Pseudoscorpiones	Chthoniidae	Chthoniidae sp. 'PC059'	1	T144226	Molecular Analysis	Surface fauna
P2	RC16MEK0002	423800	7597741	Blattodea	Indeterminate	Blattodea sp. 'indet'	1	-	Morphology	Surface fauna; Eyes and pigment present

Appendix 5

WAM Short Range Endemic Categories Guidelines

WAM SHORT-RANGE ENDEMIC CATEGORIES

	Taxonomic Certainty	Taxonomic Uncertainty
Distribution < 10 000km^2	**Confirmed SRE** • *A known distribution of < 10 000km².* • *The taxonomy is well known.* • *The group is well represented in collections and/ or via comprehensive sampling.*	**Potential SRE** • *Patchy sampling has resulted in incomplete knowledge of the geographic distribution of the group.* • *We have incomplete taxonomic knowledge.* • *The group is not well represented in collections.* • *This category is most applicable to situations where there are gaps in our knowledge of the taxon.* **Sub-categories for this SRE designation are outlined below**
Distribution > 10 000km^2	**Widespread (not an SRE)** • *A known distribution of > 10 000km².* • *The taxonomy is well known.* • *The group is well represented in collections and/ or via comprehensive sampling.*	

SRE SUB-CATEGORIES

If a taxon is determined to be a "Potential SRE", the following sub-categories will further elucidate this status.

A. *Data Deficient:*
- There is insufficient data available to determine SRE status.
- Factors that fall under this category include:
  - New species.
  - Lack of geographic information.
  - Lack of taxonomic information.
  - The group may be poorly represented in collections.
  - The individuals sampled (e.g. juveniles) may prevent identification to species level.

B. *Habitat Indicators:*
- It is becoming increasingly clear that habitat data can elucidate SRE status.
- Where habitat is known to be associated with SRE taxa and vice versa, it will be noted here.

C. *Morphology Indicators:*
- A suite of morphological characters are characteristic of SRE taxa.
- Where morphological characters are known to be associated with SRE taxa and vice-versa, it will be noted here.

D. *Molecular Evidence:*
- If molecular work has been done on this taxon (or a close relative), it may reveal patterns congruent or incongruent with SRE status.

E. *Research & Expertise:*
- Previous research and/ or WAM expertise elucidates taxon SRE status.
- This category takes into account the expert knowledge held within the WAM.