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1 Observational and metabarcoding approaches reveal the ecology, natural history and conservation  
2 status of *Scolopendra abnormis*, a threatened centipede endemic to Mauritius.

3

4 Running head: Ecology and conservation of *Scolopendra abnormis*

5

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25

26 Abstract

27

28 The Serpent Island centipede, *Scolopendra abnormis*, is a threatened centipede species found on only  
29 two small islands in the Indian Ocean: Round Island, located 22.5 km north-east of Mauritius, and  
30 Serpent Island, 4 km north-west of Round Island. Current understanding of its ecology is based on  
31 limited direct observations from 30 years ago. Round Island has since undergone significant habitat  
32 restoration. Hyperabundant non-native ants are also present, which may impact centipede nesting  
33 behaviour, ecology and survival. Recent methodological advances, such as high-throughput sequencing  
34 of dietary DNA, can extend our understanding of invertebrate ecology and provide data complementary  
35 to direct observation. Using a combination of dietary metabarcoding and observational approaches, we  
36 provide new insights into the ecology and natural history of this threatened invertebrate predator.  
37 *Scolopendra abnormis* nest most consistently in the root network found beneath endemic *Pandanus*  
38 *vandermeeschii* trees. They are also found in areas with good soil cover, herbaceous growth, and areas  
39 of bare rock slab. Only four of 43 centipedes in this study were found near an ant foraging trail, which  
40 may have significant implications for *S. abnormis* nesting habits. These centipedes primarily consume  
41 insect prey (particularly taxa within Lepidoptera, Hymenoptera, Diptera), irrespective of centipede body  
42 size. A quarter of centipedes also consumed endemic lizards. We also found marked differences in diet  
43 composition between wet and dry seasons arising from the changing availability of prey. We provide  
44 additional natural history observations and conclude by suggesting conservation actions that would help  
45 better understand and safeguard *S. abnormis* populations.

46 1. Introduction

47 Scolopendrid centipedes (Myriapoda: Chilopoda: Scolopendridae) are some of the largest and most  
48 distinctive of all terrestrial invertebrate predators. Island-dwelling *Scolopendra* may be top predators  
49 in their respective communities (McCormick & Polis 1982, Halpin et al. 2021), though little is known  
50 of the ecology of most species (Shear & Peck 1992). Conserving such species can be challenging  
51 because they may suffer a high risk of extinction before their ecology or principal threats have been  
52 identified and studied.

53 The Serpent Island centipede, *Scolopendra abnormis* Lewis and Daszak 1996 (Figure 1), is a  
54 threatened endemic species found on two small islands located north-east of Mauritius: Round Island  
55 (219 ha) and Serpent Island (32 ha; Pearce-Kelly 1996; Lewis et al. 2010). It is the only scolopendrid  
56 listed on the IUCN Red List (Vu, D2: Pearce-Kelly 1996) with only two other centipedes listed, both  
57 also endemic to islands: *Seychellonema gerlachi* (Gerlach 2014), a scutigeraid from the Seychelles, and  
58 *Nothogeophilus turki* (Macadam 2022), a geophilid from the Isles of Scilly. Unfortunately, extinction  
59 of scolopendrid centipedes from islands has occurred before, including two species from Galapagos  
60 (Shear & Peck 1992). *Scolopendra abnormis* is locally abundant and previous behavioural  
61 observations offer useful insights into its natural history (Lewis & Daszak 1996, Lewis et al. 2010),  
62 though little is known about its diet, nesting habits, or breeding behaviour. Round Island has  
63 undergone significant habitat restoration in the almost 30 years since *S. abnormis* was last studied.  
64 Much of the island is now covered in dense herbaceous cover and young trees after suffering severe  
65 habitat destruction by now-eradicated invasive herbivores. Non-native ants are abundant across  
66 Round Island (Tercel 2023), which have been shown to threaten invertebrate communities globally  
67 (Tercel et al. 2023) through predation, stinging/spraying, and competition. It is not known whether  
68 these may be affecting *S. abnormis*.

69 New molecular tools can be used to learn about target species rapidly and in unprecedented detail. For  
70 example, population genetics can be used to ascertain historical population dynamics (Bruford &  
71 Wayne 1993, Thomas et al. 2022), and dietary metabarcoding can reveal the key food resources  
72 threatened species require (Tercel et al. 2022, Moorhouse-Gann et al. 2022, Stenhouse et al. 2023).  
73 Very few studies exist that examine the diet of centipedes at all, fewer still using DNA metabarcoding  
74 (we found only two in our literature search: Eitzinger et al. 2018, Bortolin et al. 2018), and these do  
75 not assess the diets of species of high conservation concern, nor of any scolopendrids. Here, we  
76 present results from a combination of dietary metabarcoding and observational approaches to enhance  
77 our basic knowledge of the biology of *S. abnormis*. We present new insights into the ecology of *S.*  
78 *abnormis* from its Round Island population that provide possible next steps for the conservation of  
79 this species. Though we aimed to reveal more about the natural history of *S. abnormis* generally, we  
80 also wanted to answer the following questions:

- 81 1) What habitats do centipedes nest in most commonly and do non-native ants affect their  
82 nesting behaviour?  
83 2) What are the key prey groups for centipedes, do centipedes consume vertebrate prey on  
84 Round Island, and does centipede body size affect diet?  
85 3) Does centipede diet vary seasonally on Round Island?

## 86 2. Methods

### 87 2.1 Study site

88 Round Island (Figure 2) is a 219 ha basaltic cone that reaches 280 m above sea level and represents  
89 the last remnant of native lowland palm forest within the Mascarenes (Cheke & Hume 2008). The  
90 island suffered severe habitat destruction and soil erosion, leaving bare rock slab over much of the  
91 island, because of introduced goats *Capra aegagrus hircus* Linn., 1758, and rabbits *Oryctolagus*  
92 *cuniculus* Linn., 1758, which were eradicated in 1979 and 1986, respectively. Native habitat has been  
93 recovering since non-native vertebrate herbivores were eradicated (Merton 1987, Cheke & Hume  
94 2008) and is primarily dominated by the blue latan palm, *Latania loddigesii* Mart. (1838) and, to a  
95 lesser extent, the screwpine *Pandanus vandermeeschii* Balf.f. Habitat restoration intensified in 2002  
96 and there have been extensive efforts to restore the lost hardwood forests and to enhance the natural  
97 regeneration of the palm habitat (Jones 2008). Round Island has never suffered from invasion by non-  
98 native predatory mammals, such as rats, and therefore hosts many endemic species extirpated from  
99 other islands and mainland Mauritius (Cheke & Hume 2008).

100 Broad dry and wet seasons exist in Mauritius (Senapathi et al. 2009). The dry season begins in May,  
101 with low rainfall, mean air temperature of ~20.5 °C and stronger winds. The driest months are  
102 September and October. The wet season begins in December, with much more frequent rainfall, a  
103 mean air temperature of ~24.5 °C and minimal wind. The wettest months are January and February  
104 (Senapathi et al. 2009).

### 105 2.2 Centipede collection and sample processing

106 Centipedes were collected and observed by searching in soil, within and under rocks, and in leaf litter  
107 between August 2019 and March 2020. An effort was made to search for centipedes in all major  
108 habitat types across Round Island. This species is strictly nocturnal (Lewis et al. 2010) and surveys  
109 were therefore conducted during the day to locate nesting centipedes. Centipedes were collected using  
110 forceps and transferred into sterile collection tubes and subsequently frozen. To determine the most  
111 frequent nesting substrate, we conducted a habitat survey assessing the substrate type in a 4 m<sup>2</sup>  
112 quadrat centred around the location in which a centipede was found. This was done by approximating  
113 percentage cover of the following substrate types over the quadrat: bedrock, loose stones/rocks,  
114 herbaceous plant cover, soil, tree trunks, and leaf litter. We also noted all tree species within 2 m of a  
115 quadrat to determine if centipedes were associated to the root networks of any trees, whether the area

116 was densely covered in herbaceous vegetation, or whether the area was largely without significant  
117 plant growth.

118 Invasive ants are some of the most abundant invertebrates on Round Island (Tercel 2023). We wanted  
119 to determine whether these species affected the nesting behaviour of *S. abnormis*, given that both  
120 groups nest in the soil and invasive ants have been shown to reduce soil arthropod diversity  
121 substantially (Tercel et al. 2023). We therefore recorded the presence-absence of ant nests and  
122 foraging trails, and ant species identity if present, in a 5 m radius around the point a centipede was  
123 found.

124 Centipedes were killed by freezing at -20 °C and stored in 100 % ethanol until transfer to -20 °C  
125 storage at Cardiff University. A total of 43 centipedes were taken forward for dietary metabarcoding,  
126 27 from the dry season and 16 from the wet season. To remove the gut, centipedes were dissected in  
127 fresh 100 % ethanol using sterile equipment. Guts were placed separately in 1.5 mL microcentrifuge  
128 tubes and homogenised in 180 µL of lysis buffer using a Qiagen TissueLyser (Qiagen, Manchester,  
129 UK) with sterile steel beads at 60 Hz for 30 seconds. To determine if centipede size influences dietary  
130 composition, we measured centipede head width and body length during dissections using electronic  
131 callipers with a precision of 0.01 mm. These measurements may not exactly represent the dimensions  
132 of living centipedes due to centipedes changing size in ethanol; all samples were treated the same.

### 133 *2.3 Dietary metabarcoding*

134 High-throughput sequencing methods broadly followed Tercel et al. (2022): DNA extraction followed  
135 DNeasy Blood & Tissue Kit manufacturer recommendations, but with a lysis time of approximately  
136 14 hours to increase penetration of chitinous tissue. We used one negative control per seven samples,  
137 which comprised molecular grade water treated identically to samples. Polymerase chain reactions  
138 (PCR) were used to amplify dietary DNA using invertebrate primers BerenF-LuthienR (Cuff et al.  
139 2021) and AntExF-AntExR (Tercel 2023; Table S1 and see the Appendices of Tercel 2023 for full  
140 primer validation). These amplify 314bp and 214bp fragments of the mitochondrial COI gene,  
141 respectively, and broadly amplify the DNA of terrestrial invertebrates found on Round Island (Tercel  
142 2023). Beren-Luthien also amplify the DNA of several vertebrate species on Round Island, such as the  
143 skinks, geckos, and seabirds. We used two primer pairs for centipede dietary DNA amplification,  
144 which mitigates the problems associated with using a single primer pair (Tercel et al. 2021, Cuff et al.  
145 2023). Primers were uniquely labelled using 8bp molecular identification tags (MID-tags) to identify  
146 samples bioinformatically. PCR products were analysed for fragment sizes and concentrations via  
147 QIAxcel, and subsequently pooled for equimolarity and cleaned: each pool was cleaned using  
148 SPRIselect beads (Beckman Coulter, Brea, USA), with a left-side size selection using a 1:1 ratio.  
149 Libraries were prepared for Illumina sequencing using NEXTflex™ Rapid DNA-Seq Kit following  
150 the manufacturer's instructions (Bioo Scientific Corp, Austin, TX, United States). To confirm

151 fragment size and correct ligation of adapters, libraries were run on an Agilent 4200 TapeStation with  
152 D1000 ScreenTape (Agilent Technologies, Waldbronn). PCR products from each primer pair were  
153 sequenced separately using an Illumina MiSeq as part of a larger project. BerenF-LuthienR amplicons  
154 were sequenced on a V3 cartridge using 2 x 300 bp reads, and AntExF-AntExR with a V2 cartridge  
155 using 2 x 250 bp reads. The Illumina sequencing runs generated an average read depth of 8,151 and  
156 12,993 per sample for AntEx and Beren-Luthien primer pairs, respectively.

157 Bioinformatics and data cleaning followed Tercel (2023): FastP (Chen et al. 2018) was used to check  
158 the quality of reads, discard poor quality reads ( $< Q30$ ,  $< 125$ bp long or too many unqualified bases,  
159 denoted by “N”), trim reads to a minimum length specific to each primer pair (AntEx: 214bp, Beren-  
160 Luthien: 314bp) and merge read pairs from MiSeq files (R1 and R2). Read pairs were assigned to  
161 samples and demultiplexed using Mothur v1.39.5 (Schloss et al. 2009), after which MID-tag and  
162 primer ends were removed. Unoise3 (Edgar 2010) was used to remove replicates, denoise the  
163 sequences, and group identical sequences into zero-radius operational taxonomic units (zOTUs, which  
164 are clustered without % identity to avoid multiple species being nested within an OTU). These zOTUs  
165 are analogous to species-level identifications but may not be assigned a full binomial species name  
166 (e.g., family- or genus-level taxonomy may be assigned if the species has not been barcoded).  
167 BLASTn with an up-to-date BLAST database downloaded from GenBank was used to directly assign  
168 taxonomic identities to each zOTU (Camacho et al. 2009). The Round Island system has not received  
169 much entomological study, and thus morphological identification resources are not easily accessible  
170 for most groups. Many of Round Island’s invertebrates have therefore also never been barcoded. In  
171 these cases, different species of the same family or genus are given higher-level taxonomic  
172 information and then numbered (e.g., Noctuidae species 1, species 2, species 3; Braconidae species 1,  
173 species 2, etc.). Data were cleaned for statistical analysis broadly following the same methods as  
174 Tercel *et al.* (2022), whereby we removed the maximum read count found in blanks and negative  
175 controls for each taxon from all samples. After data clean-up, 43 centipede samples were taken  
176 forward for statistical analysis. Since it is impossible with the data generated to ascertain how many  
177 prey of each species were consumed by an individual centipede, any number of sequencing reads after  
178 data-cleaning within a centipede gut DNA sample was considered a single detection (i.e., frequency of  
179 occurrence).

#### 180 *2.4 Statistical analyses*

181 All statistical analyses were conducted in R version 4.3.1 (R Core Team 2023). We wanted to test  
182 whether centipede dietary richness was significantly different between seasons. Data were not  
183 normally distributed (Shapiro-Wilk:  $W = 0.77$ ,  $p$ -value =  $< 0.001$ ), thus we used the non-parametric  
184 Mann-Whitney U test to assess this. As well as richness, we tested whether diet composition varied  
185 between seasons using R package ‘mvabund’ (Wang et al. 2012). Multivariate generalised linear

186 models (MGLMs) were run using the “manyglm” function with a Monte Carlo resampling method  
187 and “binomial” error family. Similarly, we tested whether body length, head width, or overall body  
188 size (length multiplied by width) affected dietary composition using the ‘manyglm’ function and used  
189 the “p.uni = adjusted” command in the “anova.manyglm” function to test whether consumption of any  
190 specific dietary taxa varied with body size, including any vertebrate prey. Variation in the diet was  
191 visualised using non-metric multidimensional scaling analysis (NMDS) using the “metaMDS”  
192 function in the “vegan” R package (Oksanen et al. 2019) with Jaccard distance and was plotted using  
193 “ggplot2” (Wickham 2016). We used simple linear regression to determine the relationship between  
194 body length and head width.

### 195 3. Results and discussion

#### 196 3.1 Nesting habits

197 The average (mean  $\pm$  SE) substrate of a 4 m<sup>2</sup> quadrat where centipedes were found consisted of 37.8  
198 % ( $\pm$  3.33) bedrock, 3 % ( $\pm$  0.48) loose rock, 10.6 % ( $\pm$  2.27) herbaceous cover, 15.2 % ( $\pm$  1.7) soil,  
199 7.2 % ( $\pm$  1.29) tree trunk, and 26.1 % ( $\pm$  2.67) leaf litter. Centipedes were almost exclusively found  
200 under or between slabs of rock or beneath thick leaf litter (>4 cm depth) within these quadrats.

201 Individuals were most reliably found in the root networks, rocks, and leaf litter beneath *Pandanus*  
202 trees (58 %), though some were found near *Latania* palms (16 %). The remaining centipedes were  
203 found either in areas of dense herbaceous cover (7 %) or without significant plant growth (19 %). Our  
204 surveys update previous observations that this centipede does not nest in areas with thick plant  
205 growth, good soil cover, or rocks embedded in soil (Lewis et al. 2010). Since the last surveys in 1996,  
206 soil, vegetation, and tree cover on Round Island have increased with habitat regeneration. Indeed, the  
207 majority of centipedes were found in quadrats with significant soil accumulation and several  
208 individuals were found nesting directly within soil underneath rocks surrounded by herbaceous plants.  
209 Grazing damage by goats and rabbits left much of the island an expanse of exposed rock (North et al.  
210 1994, Bullock et al. 2002) that may have restricted centipede nest sites to rocky stacks and crevices  
211 (Lewis et al. 2010). However, before habitat destruction took place on Round Island, centipedes  
212 probably nested primarily in the forest root network and rocks embedded in the soils of the forest  
213 floor beneath thick leaf litter.

214 Our ant surveys also show that centipedes tend to nest in areas of low ant activity. Of the 43  
215 centipedes collected, only four were near an ant foraging trail and none were within 5 m of ant nests.  
216 In contrast, a separate study randomly generated 69 quadrats over Round Island and found ants in all  
217 quadrats (Tercel 2023), including in quadrats generated in *Pandanus* thicket habitat, i.e., where  
218 centipedes are most reliably found nesting. Whilst the discrepancy in the occurrence of ants could be  
219 down to simple differences in habitat preferences, non-native ants have been shown to reduce the  
220 diversity of soil-dwelling invertebrate communities substantially (Tercel et al. 2023) through



221 predation and competition, as well as indirect effects. Centipedes on Round Island may be vulnerable  
222 to attack by non-native ants whilst nesting during the day and may therefore avoid nesting in areas  
223 where ants are particularly abundant.

### 224 3.2 Diet richness and drivers of diet composition

225 A total of 432 prey detections from 63 prey taxa were found across the 43 centipede individuals. The  
226 mean number of prey taxa per centipede was 10.04 ( $\pm$  7.27 SD). Centipedes were found to be  
227 consuming a broad range of prey, though primarily consumed taxa within Lepidoptera, Hymenoptera  
228 and Diptera (Figure 3). Approximately 25 % of centipedes consumed Bojer's skink, *Gongylomorphus*  
229 *bojerii* (Desjardins, 1831), a critically endangered diurnal skink endemic to Mauritius (Cole & Payne  
230 2022) that is abundant on Round Island (Cole et al. 2018). Young adult and juvenile Bojer's skinks  
231 could be easily overpowered by centipedes, especially during the night when skinks are inactive and  
232 centipedes are typically hunting. Notably, we did not detect consumption of Durrell's night gecko,  
233 *Nactus durrellorum* Arnold and Jones, 1994, a similarly sized but nocturnal small lizard which may be  
234 capable of escaping *S. abnormis* at night. Previous diet observations suggest that *S. abnormis*  
235 consumes invertebrates they can overpower, such as the abundant cockroaches on Round Island  
236 (Lewis et al. 2010), as well as carcasses they can scavenge (Lewis & Daszak 1996, Pearce-Kelly  
237 1996, Lewis et al. 2010), including the carcasses of seabirds on Serpent Island. Our dietary analysis  
238 corroborates this, though we did not find evidence of seabird consumption despite the PCR primers  
239 used being able to amplify them. Carrion DNA may be more degraded, limiting its detection, although  
240 it is usually detectable for relatively long periods (Neidel et al. 2022). The density and overall biomass  
241 per unit area of seabirds on Round Island is much lower than on Serpent Island and centipedes may  
242 therefore scavenge seabird tissue far less often on Round Island. The high occurrence rate of  
243 Lepidoptera is unsurprising given the diverse and highly abundant moth assemblage of Round Island  
244 (Tercel and Cole, unpubl. data), though this had not been observed previously (Lewis et al. 2010).  
245 Several species of moth are found primarily on expanses of rock slab, where centipedes are often seen  
246 at night.

247  
248 A Mann-Whitney U test showed that centipedes had significantly higher diet richness in the dry  
249 season compared to the wet season ( $W = 360.5$ ,  $p < 0.001$ ; mean: dry = 15.88, wet = 6.59). The  
250 MGLMs demonstrate that dietary composition also differed between seasons (LRT: 13.36,  $df = 1$ ,  $p <$   
251  $0.001$ ; Figure 4, stress value = 0.17), probably arising from large seasonal changes in vegetation and  
252 the abundance of potential prey species on Round Island (Tercel 2023). Dietary composition appears  
253 to be more consistent between centipedes in the dry season whilst also being more diverse in absolute  
254 terms (Figure 4). Centipede individuals in the dry season have considerably more consistent diets than  
255 those in the wet season, i.e., they share a greater number of dietary species, whilst they also consume  
256 more species in total. Seasonal changes to diet have also been shown for other consumers on Round

257 Island (Zuël 2009, Tercel et al. 2022, Moorhouse-Gann et al. 2022, Tercel 2023). Two non-exclusive  
258 reasons could explain the markedly higher dietary diversity of *S. abnormis* in the dry season. The first  
259 is that the diversity of potential invertebrate prey on Round Island is higher in the dry season (Tercel  
260 2023). The second is that low humidity during the dry season may drive centipedes to consume more  
261 prey to obtain hydration, as many invertebrate predators obtain significant hydration directly from  
262 their food.

263 *Scolopendra* centipedes are generally thought to be able to consume anything they can overpower  
264 (McCormick & Polis 1982, Halpin et al. 2021), and this is likely to be true for *S. abnormis*. However,  
265 our MGLMs investigating the relationship between body size and diet composition show that they are  
266 unrelated (body length: LRT = 9.58, res.df = 41, p = 0.64; head width: LRT = 7.6, res.df = 40, p =  
267 0.68; body size: LRT = 7.65, res.df = 39, p = 0.68). Despite this, we also tested whether larger  
268 centipedes were more likely to consume Bojer's skinks. Simple linear regression showed the expected  
269 morphological relationship between centipede head width and body length ( $R^2 = 0.89$ , df = 41, p =  
270 <0.001; head width = 11.479 \* body length + 5.882; Figure 5), but we found no relationship between  
271 centipede body size and predation of Bojer's skinks from our univariate mvabund analysis (Dev =  
272 0.123, res.df = 39, p = 0.99). Scolopendrid centipedes have been seen consuming vertebrates in other  
273 island systems (McCormick & Polis 1982, Halpin et al. 2021), and approximately 25 % of *S.*  
274 *abnormis* centipedes were found to have consumed skinks. Bojer's skinks may therefore represent an  
275 important source of nutrition for *S. abnormis* given that they are presumably amongst the largest food  
276 items available to centipedes based on our dietary analysis.

### 277 3.3 Additional observations

278 Our surveys revealed that the mating season of *S. abnormis* takes place in the wet season. Females  
279 nurse clutches of 25-40 eggs in their nests (Supplementary Figure S1) from at least late-February to  
280 late-March, though the breeding season may extend from December through to April. Some  
281 centipedes appeared to be nursing their eggs in nests resting on heavily water-logged soil beneath  
282 rocks. No females tending eggs have been seen in the dry season.

283 Multiple adult centipedes were sometimes found in a single nest site showing no aggression to one  
284 another. A lack of aggression was observed in a previous study that experimentally induced meeting  
285 reactions (Lewis & Daszak 1996, Lewis et al. 2010). This could be an adaptation to a previously much  
286 higher density of centipedes on Round Island before habitat loss, though cannibalism has been shown  
287 from populations of *S. abnormis* on Serpent Island where, due to almost no vegetation, resource  
288 availability is presumed to be far more limited (Nik Cole, pers. obs.).

### 289 3.4 Conservation of *Scolopendra abnormis*

290 The population of *S. abnormis* on Round Island appears healthy: they are readily found over much of  
291 the island, are commonly seen at night in multiple habitats, and can obtain nutrition from many prey  
292 species. However, *S. abnormis* is found only on two small islands, and is therefore listed as  
293 Vulnerable, D2: a “restricted distribution” and “susceptible population”, on the IUCN Red List  
294 (Pearce-Kelly 1996). The principal threat to *S. abnormis* therefore comes from the potential  
295 introduction of invasive mammalian predators to these islands (Lewis et al. 2010). Our study suggests  
296 that invasive ants may be causing a problem for centipedes whilst nesting. Centipedes nest in areas  
297 with relatively low ant presence, despite a generally high abundance of ants over Round Island. Ants  
298 might restrict *S. abnormis* to certain areas and limit the population by evicting them from potential  
299 nest sites, which may be particularly problematic for females nursing eggs. Establishing ant  
300 suppression plots on Round Island would allow this to be tested experimentally, as well as examining  
301 the wider effects of non-native ants on the invertebrate community, which may have important  
302 ramifications for centipede diet.

303 A captive breeding program for *S. abnormis* could be implemented, which would safeguard their  
304 future and genetic diversity in the event of invasions by other non-native species or the population  
305 expansion of invasive ants on Round Island. Captive populations could also be used to translocate  
306 centipedes to islands that were thought to host the species previously. Gunner’s Quoin, for example,  
307 may have hosted *S. abnormis* in the past before rats invaded. However, the island is similarly invaded  
308 by ants and hosts several species found nowhere else. It is possible the centipedes may even pose a  
309 risk to some of these endemic species. Increasing the number of sites of occupancy would help  
310 safeguard *S. abnormis* in the event of environmental incidents or further biological invasions, but  
311 translocation events would need to be carefully planned to maximise their conservation value to the  
312 wider ecosystem.

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### 320 Conflict of interest statement

321 The authors have no conflicts of interest to declare.

### 322 Data availability

323 Data are available as supplementary files.

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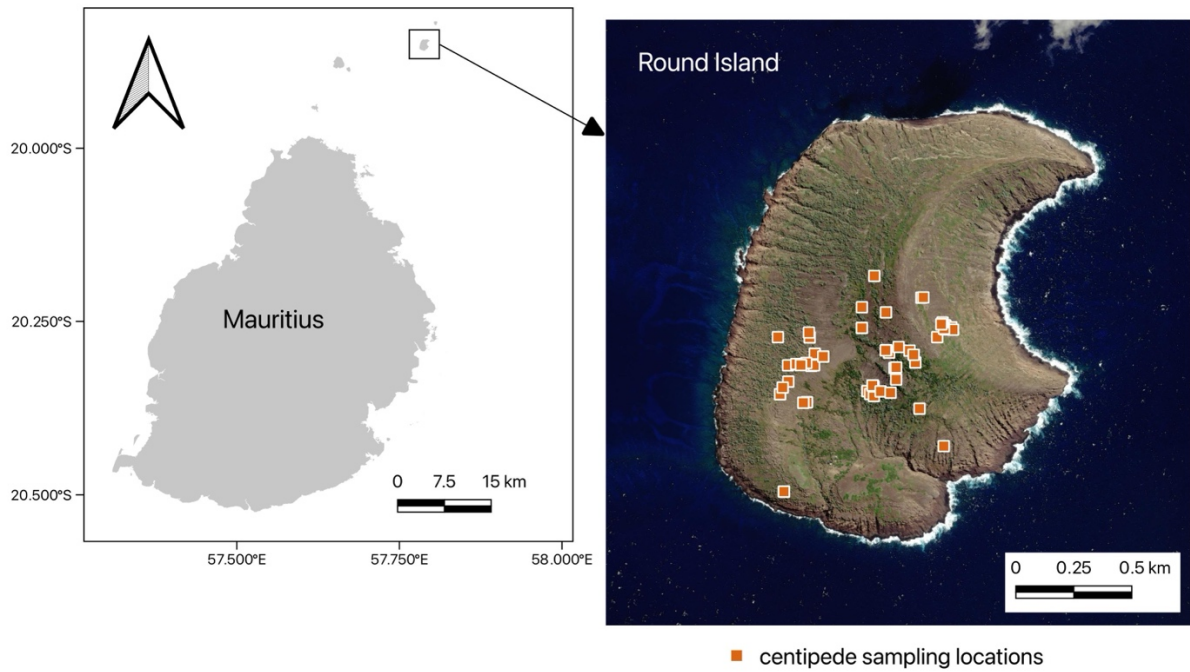


409

410 Figure 1. The Serpent Island centipede, *Scolopendra abnormis*, photographed on Round Island, 2023.

411 This individual was approximately 90 mm in length. Photograph by MPTGT.

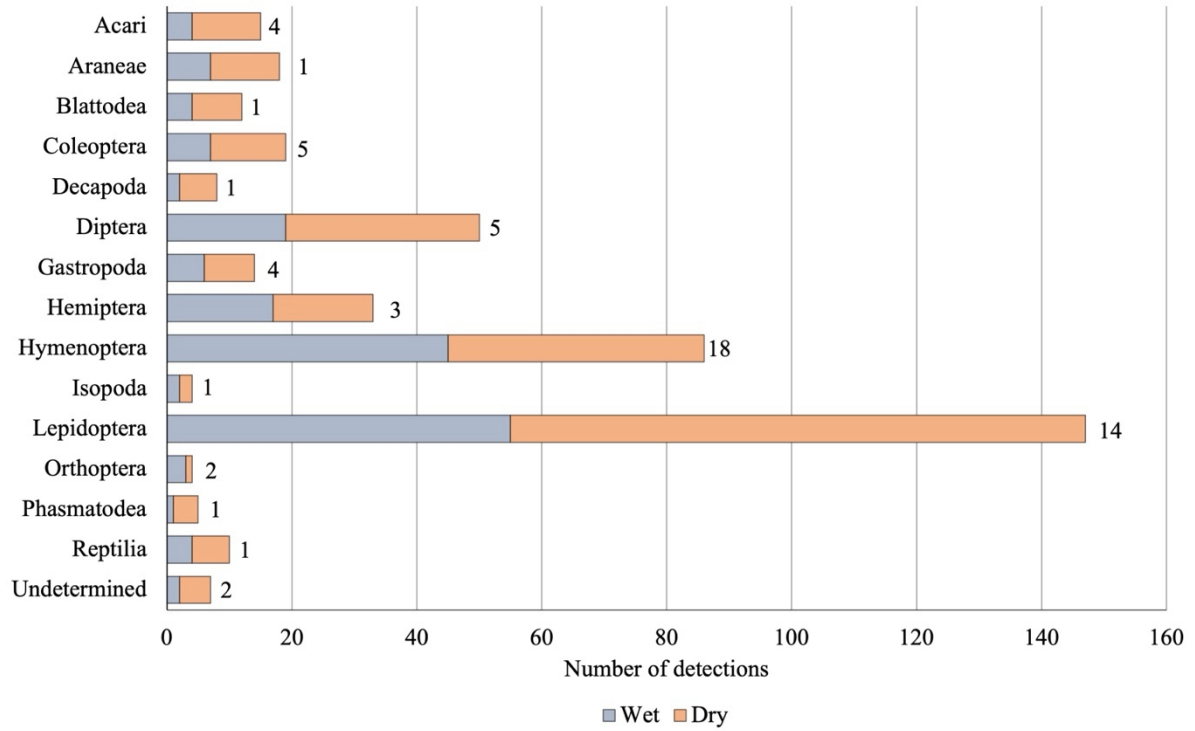
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414 Figure 2. The position of Round Island in the Mauritian archipelago and centipede sampling sites  
 415 across Round Island (basemap: Google © 2021).

416

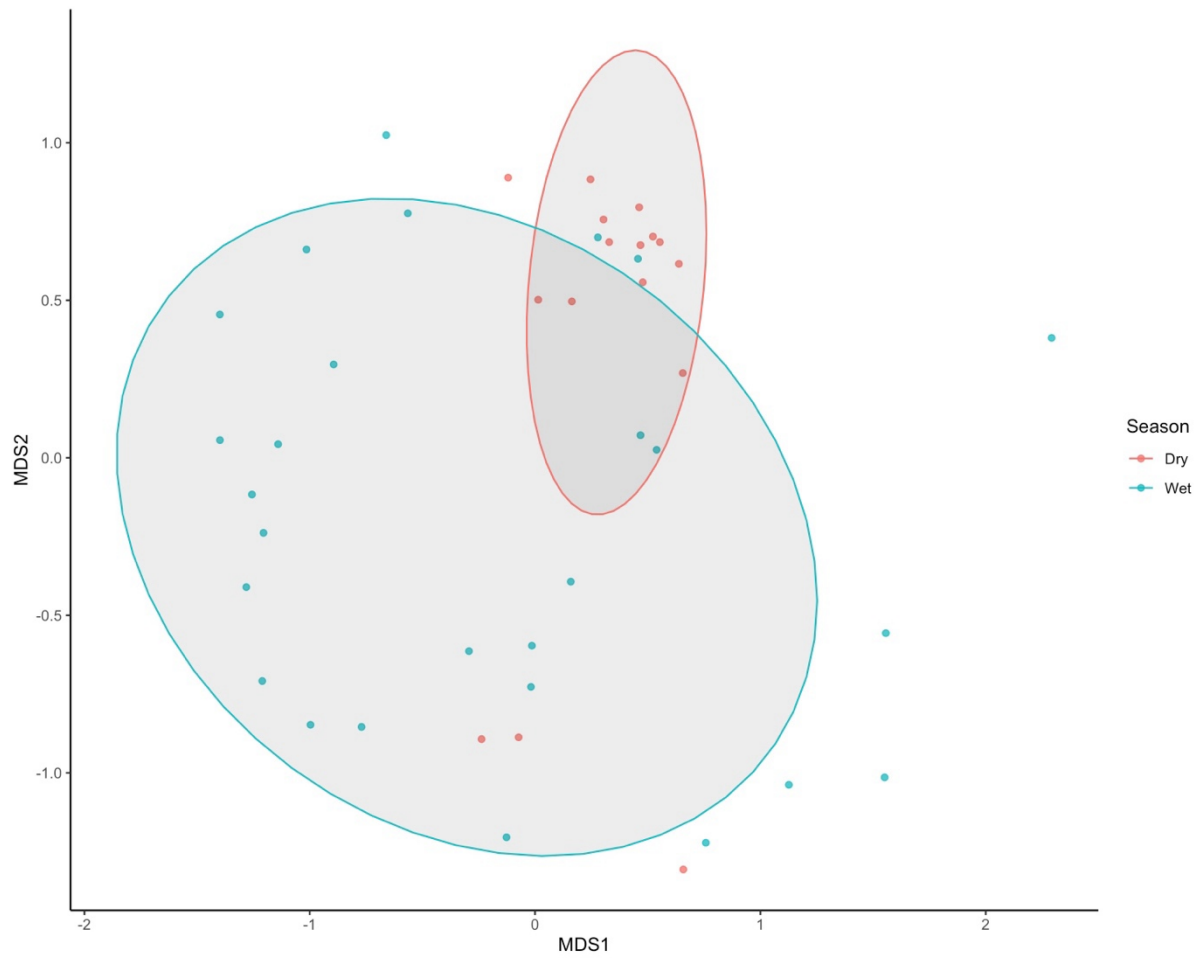


417

418 Figure 3. *Scolopendra abnormis* diet (n = 43) represented as number of prey detections for different  
 419 animal groups. Stacked bars show the number of detections for a given group in wet (blue-grey) and  
 420 dry (orange) seasons. Numbers to the right of the bars denote the number of species-level prey taxa  
 421 within each group.

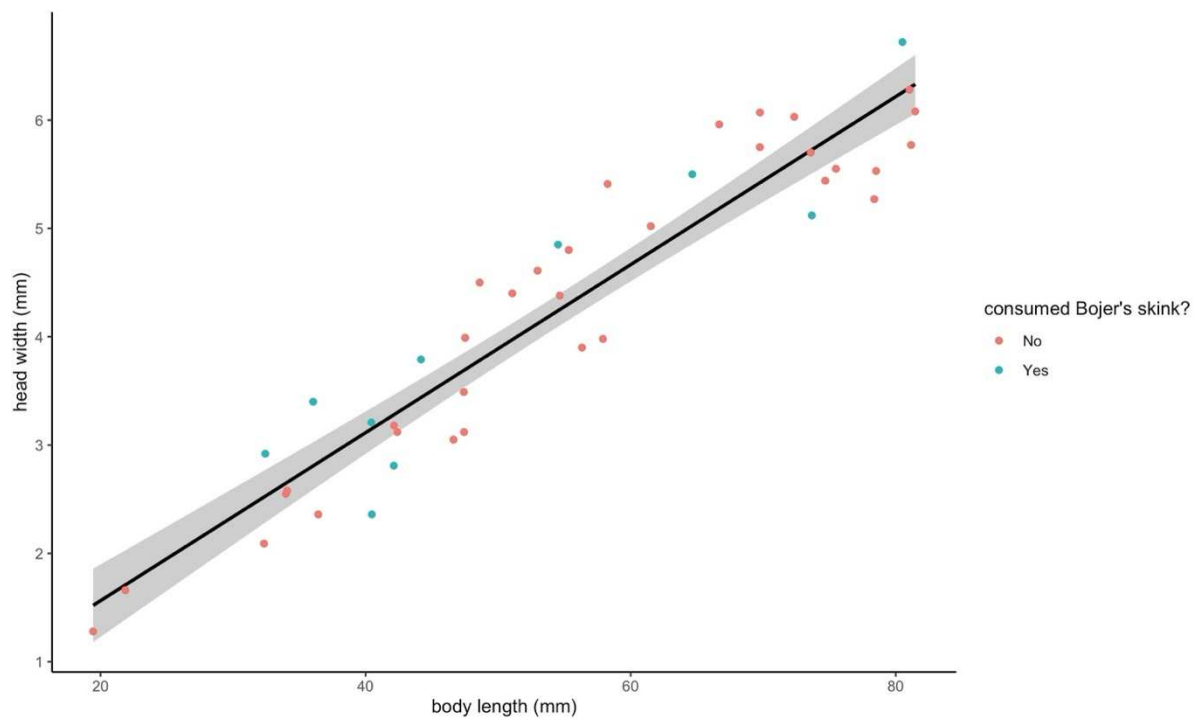
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424 Figure 4. Centipede diet composition visualised using non-metric multidimensional scaling. Each  
425 point represents the dietary composition of a centipede individual. Colours denote the season that  
426 samples were collected in. Ellipses are 80% data circles. Stress value = 0.17.

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429

430 Figure 5. The relationship between centipede body length and head width. Each point represents an

431 individual centipede; dark line is the line of best fit, grey shading denotes 95% error margins.

432 Centipedes found to have consumed Bojer's skink are represented by light blue points.

433