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Reproduction and behaviour of the Mahoenui Weta, *Deinacrida n.sp.*

A thesis presented in partial fulfilment of the requirements for the degree of Masterate of Science in Ecology at Massey University.

Sub adult female Mahoenui weta *Deinacrida n.sp.* in hand (Photograph by Penny Aspin).

Elizabeth Domett
1996
Title of thesis: Reproduction and behaviour of the Mahoenui weta *Deinacrida* n.sp.

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Abstract

The morphology and histology are described for the entire male internal reproductive organs of the Mahoenui weta. These show many similarities to other Stenopelmatidae. Testes follicles of Mahoenui weta have the usual structure for Stenopelmatidae with basal sections surrounding the ends of the vasa efferentia. Epithelial cells of the vasa efferentia, vasa deferentia and seminal vesicle have similar basophilic cytoplasm. Muscle layers are best developed around the seminal vesicle and the accessory glands. The ejaculatory duct has a cuticular intima and is enclosed by a muscular sheath. The development of the external genitalia from the 8th to the 10th instar is followed and discussed. The morphology of the external reproductive genitalia is close in form to that of the Rhaphidophoridae.

The morphology and histology of the entire female reproductive organs of the Mahoenui weta are described. The morphology and histology of female Mahoenui weta are very similar to those of other Orthoptera. The histology is particularly close to that of the Acrididae. Ovaries and ovarioles have the usual structure for Stenopelmatidae. The follicles are enclosed within a follicular epithelium and the ovarioles are enclosed within an outer ovariole sheath layer of connective tissue. The epithelial cells of the ovarioles and lateral oviducts have basophilic cytoplasm. The vagina is lined with a cuticular intima and is surrounded by a muscular sheath. The external genitalia are described from 8th to 10th instar Mahoenui weta and their probable functions are discussed.

The behaviour of captive Mahoenui weta was observed, using infra-red time lapse video. Data were recorded from the months of December, January, February, March and July. Weta ate most often in January, March and July, and most mating activity occurred during January. Mahoenui weta were consistently most active at 60-80% of total night-time and showed less activity closer to sunrise or sunset. Mating and moulting are discussed.

Incubation time of Mahoenui weta eggs was recorded using eggs laid in a previous study (Richards 1994). The time of hatching and the behaviour of newly hatched nymphs was recorded over several days using video equipment. All eclosion occurred at night, with time of eclosion ranging from 8 pm to 3.30 am over the three
nights. Weta were free of the egg and walked within 17 minutes of the egg appearing on
the soil surface. All hatched weta died within three days of eclosion. The external
appearance and histology of eggs is described. Mahoenui weta eggs have many features
in common with other Orthoptera.

Mahoenui weta were exposed to 12 different plant species commonly fed to
them in captivity, and present in the Mahoenui weta reserve. The weight of plant
material eaten was recorded to determine which species of plant the weta preferred.
Mahoenui weta showed the greatest preference for kowhai followed by gorse, broom,
buttercup, tawa, karaka, coprosma, camellia, lemonwood, mahoe, houhere and hoheria.
There was a marked preference for legume plant species over non-legumes.
# Table of contents

<table>
<thead>
<tr>
<th>Acknowledgements</th>
<th>i</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii-iii</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>iv</td>
</tr>
<tr>
<td>List of figures and tables</td>
<td>v-x</td>
</tr>
<tr>
<td>Chapter 1 -</td>
<td>1-5</td>
</tr>
<tr>
<td>Introduction</td>
<td></td>
</tr>
<tr>
<td>Chapter 2 -</td>
<td>6-29</td>
</tr>
<tr>
<td>The male reproductive system of <em>Deinacrida</em> n.sp. Mahoenui (Orthoptera: Stenopelmatidae)</td>
<td></td>
</tr>
<tr>
<td>Chapter 3 -</td>
<td>30-51</td>
</tr>
<tr>
<td>The female reproductive system of <em>Deinacrida</em> n.sp. Mahoenui (Orthoptera: Stenopelmatidae)</td>
<td></td>
</tr>
<tr>
<td>Chapter 4 -</td>
<td>52-73</td>
</tr>
<tr>
<td>Captive behaviour patterns of the Mahoenui weta <em>Deinacrida</em> n.sp.</td>
<td></td>
</tr>
<tr>
<td>Chapter 5 -</td>
<td>74-78</td>
</tr>
<tr>
<td>Egg histology and hatching time.</td>
<td></td>
</tr>
<tr>
<td>Chapter 6 -</td>
<td>79-86</td>
</tr>
<tr>
<td>Comparative feeding preferences of the Mahoenui weta <em>Deinacrida</em> n.sp.</td>
<td></td>
</tr>
<tr>
<td>Chapter 7 -</td>
<td>87-89</td>
</tr>
<tr>
<td>Summary</td>
<td></td>
</tr>
<tr>
<td>Appendix</td>
<td>90-107</td>
</tr>
<tr>
<td>References</td>
<td>108-112</td>
</tr>
</tbody>
</table>
List of figures and tables

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1.1:</td>
<td>3</td>
<td>North Island of New Zealand, showing location of Mahoenui.</td>
</tr>
<tr>
<td>Figure 1.2:</td>
<td>4</td>
<td>Aerial view of the Mahoenui weta reserve. Black outline shows borders of reserve.</td>
</tr>
<tr>
<td>Figure 1.3:</td>
<td>5</td>
<td>Gorse in Mahoenui weta reserve.</td>
</tr>
<tr>
<td>Figure 1.4:</td>
<td>5</td>
<td>Looking out over Mahoenui weta reserve.</td>
</tr>
<tr>
<td>Figure 2.1:</td>
<td>8</td>
<td>The morphology of the male Mahoenui weta internal reproductive structures.</td>
</tr>
<tr>
<td>Figure 2.2:</td>
<td>9</td>
<td>Mahoenui weta. Dissection of abdomen showing reproductive organs.</td>
</tr>
<tr>
<td>Figure 2.3:</td>
<td>9</td>
<td>Mahoenui weta. Dissection of abdomen showing accessory glands and seminal vesicle.</td>
</tr>
<tr>
<td>Figure 2.4:</td>
<td>9</td>
<td>Mahoenui weta follicle, showing sections within.</td>
</tr>
<tr>
<td>Figure 2.5:</td>
<td>14</td>
<td>Mahoenui weta testis, transverse section in situ.</td>
</tr>
<tr>
<td>Figure 2.6:</td>
<td>14</td>
<td>Vas efferens (VE) of Mahoenui weta in testis, oblique section.</td>
</tr>
<tr>
<td>Figure 2.7:</td>
<td>15</td>
<td>Mahoenui weta testis, transverse section.</td>
</tr>
<tr>
<td>Figure 2.8:</td>
<td>15</td>
<td>Mahoenui weta vas deferens, oblique section.</td>
</tr>
<tr>
<td>Figure 2.9:</td>
<td>16</td>
<td>Accessory gland (AG) and seminal vesicle (SV) of Mahoenui weta, transverse section.</td>
</tr>
<tr>
<td>Figure 2.10:</td>
<td>16</td>
<td>Mahoenui weta seminal vesicle, oblique section.</td>
</tr>
<tr>
<td>Figure 2.11:</td>
<td>17</td>
<td>Mahoenui weta ejaculatory duct, longitudinal section.</td>
</tr>
<tr>
<td>Figure 2.12:</td>
<td>17</td>
<td>Key for external genitalia of the male Mahoenui weta.</td>
</tr>
<tr>
<td>Figure 2.13:</td>
<td>18</td>
<td>External genitalia of eighth instar male Mahoenui weta, dorsal view.</td>
</tr>
<tr>
<td>Figure 2.14:</td>
<td>19</td>
<td>External genitalia of eighth instar male Mahoenui weta, lateral view.</td>
</tr>
<tr>
<td>Figure 2.15:</td>
<td>20</td>
<td>External genitalia of eighth instar male Mahoenui weta, ventral view.</td>
</tr>
</tbody>
</table>
Figure 2.16: External genitalia of ninth instar male Mahoenui weta, lateral view.
Figure 2.17: External genitalia of ninth instar male Mahoenui weta, dorsal view.
Figure 2.18: External genitalia of ninth instar male Mahoenui weta, ventral view.
Figure 2.19: External genitalia of tenth instar male Mahoenui weta, dorsal view.
Figure 2.20: External genitalia of tenth instar male Mahoenui weta, ventral view.
Figure 2.21: External genitalia of tenth instar male Mahoenui weta, lateral view.
Figure 2.22: External genitalia of tenth instar male Mahoenui weta, with subgenital plate removed (dotted line denotes position of removed plate), to show penis.

Figure 3.1: Internal reproductive structures of the adult female Mahoenui weta.
Figure 3.2: Ninth instar Mahoenui weta female reproductive organs.
Figure 3.3: Mahoenui weta ovariole sheath, longitudinal section.
Figure 3.4: Mahoenui weta lateral oviduct, transverse section.
Figure 3.5: Mahoenui weta spermatheca (cut through twice due to bent nature), transverse section.

Table 3.1: Dimensions of female reproductive organs of the Mahoenui weta Deinacrida n.sp. from four field collected specimens.
Figure 3.6: Key for external genitalia diagrams of the female Mahoenui weta.
Figure 3.7: External genitalia of eighth instar female Mahoenui weta, dorsal view.
Figure 3.8: External genitalia of eighth instar female Mahoenui weta, ventral view.
Figure 3.9: External genitalia of eighth instar female Mahoenui weta, lateral view.

Figure 3.10: External genitalia of ninth instar female Mahoenui weta, dorsal view.

Figure 3.11: External genitalia of ninth instar female Mahoenui weta, ventral view.

Figure 3.12: External genitalia of ninth instar female Mahoenui weta, lateral view.

Figure 3.13: External genitalia of tenth instar female Mahoenui weta, dorsal view.

Figure 3.14: External genitalia of tenth instar female Mahoenui weta, ventral view.

Figure 3.15: External genitalia of tenth instar female Mahoenui weta, lateral view.

Figure 3.16: External genitalia of first instar Mahoenui weta, ventral view.

Figure 3.17: External genitalia of an adult female Mahoenui weta, ventral view, with subgenital plate removed to show structures beneath. (dotted line indicates position of removed plate).

Figure 4.1: Average percentages of behaviour exhibited by Mahoenui weta over eighteen nights of observation during December. (three adult females and two adult males).

Figure 4.2: Average percentages of behaviour exhibited by Mahoenui weta over four nights of observation during January. (three adult females and two adult males).

Figure 4.3: Average percentages of behaviour exhibited by Mahoenui weta over nine nights of observation during February. (one adult female and one adult male).

Figure 4.4: Average percentages of behaviour exhibited by Mahoenui weta over sixteen nights of observation during March. (one subadult female and two subadult males).
Figure 4.5: 58 Average percentages of behaviour exhibited by Mahoenui weta over thirteen nights of observation during July. (one subadult female and one subadult male).

Figure 4.6: 59 Percentage of hiding activity throughout night per month.

Figure 4.7: 59 Percentage of sitting activity throughout night per month.

Figure 4.8: 60 Percentage of eating activity throughout night per month.

Figure 4.9: 60 Percentage of moving activity throughout night per month.

Figure 4.10: 61 Percentage of attempted mating and interaction activity throughout night per month.

Figure 4.11: 61 Percentage of drinking activity throughout night per month.

Figure 4.12: 66 Mahoenui weta mating.

Figure 4.13: 67 Mahoenui weta moulting.

Figure 4.14: 67 Male Mahoenui weta showing defence posture.

Figure 5.1: 76 Section through an unladen egg of the Mahoenui weta.

Figure 5.2: 76 Newly hatched Mahoenui weta.

Figure 5.3: 77 Egg shell of newly hatched Mahoenui weta.

Figure 6.1: 80 Mahoenui study site, showing extensive gorse *U. europaeus* cover, including pasture and some native species in the gullies (Mahoe, Cabbage tree and Tawa).

Figure 6.2: 82 Mean ± SE of weight of each plant species eaten by Mahoenui weta in trial one.

Figure 6.3: 82 Mean ± SE of weight of each plant species eaten by Mahoenui weta in trial two.

Table 6.1: 83 Weight of each plant species eaten by Mahoenui weta averaged over both trial one and two.

Figure A.1: 91 Eighth instar male Mahoenui weta, dorsal view.

Figure A.2: 91 Eighth instar male Mahoenui weta, lateral view.

Figure A.3: 91 Eighth instar male Mahoenui weta, ventral view.

Figure A.4: 92 Ninth instar male Mahoenui weta, dorsal view.

Figure A.5: 92 Ninth instar male Mahoenui weta, lateral view.

Figure A.6: 92 Ninth instar male Mahoenui weta, ventral view.
Figure A.7: 93 Tenth instar male Mahoenui weta, dorsal view.
Figure A.8: 93 Tenth instar male Mahoenui weta, lateral view.
Figure A.9: 93 Tenth instar male Mahoenui weta, ventral view.
Figure B.1: 94 Eighth instar female Mahoenui weta, dorsal view.
Figure B.2: 94 Eighth instar female Mahoenui weta, lateral view.
Figure B.3: 95 Eighth instar female Mahoenui weta, ventral view.
Figure B.4: 95 Ninth instar female Mahoenui weta, dorsal view.
Figure B.5: 96 Ninth instar female Mahoenui weta, lateral view.
Figure B.6: 96 Ninth instar female Mahoenui weta, ventral view.
Figure B.7: 97 Tenth instar female Mahoenui weta, dorsal view.
Figure B.8: 97 Tenth instar female Mahoenui weta, lateral view.
Table C.1: 98 Percentage of behaviour throughout percentage of night for December.
Table C.2: 98 Percentage of behaviour throughout percentage of night for January.
Table C.3: 98 Percentage of behaviour throughout percentage of night for February.
Table C.4: 99 Percentage of behaviour throughout percentage of night for March.
Table C.5: 99 Percentage of behaviour throughout percentage of night for July.
Table C.6: 99 Percentage of hiding throughout night per month.
Table C.7: 100 Percentage of sitting throughout night per month.
Table C.8: 100 Percentage of moving throughout night per month.
Table C.9: 100 Percentage of eating throughout night per month.
Table C.10: 101 Percentage of drinking throughout night per month.
Table C.11: 101 Percentage of attempted matings and interactions throughout night per month.
Figure C.12: 102 Scatterplot of percentage of hiding versus percentage of sitting for December.
Figure C.13: 103 Scatterplot of percentage of hiding versus percentage of sitting for January.
Table D.1: 103  Time of hatching for three nights observed on video.
Table D.2: 104  Date of birth and number hatched for first instar weta.
Table D.3: 105  Hatched egg length and mean egg length.
Table E.1: 106  Weta used in trial 1 and 2.
Table E.2: 106  Amount eaten in grams of plants for trial 1.
Table E.3: 107  Amount eaten in grams of plants for trial 2.