THE SURVIVAL OF THE DESERT ISOPOD *HEMILEPISTUS REAUMURII* (AUDOUIN) IN RELATION TO TEMPERATURE (ISOPODA, ONISCOIDEA)

BY

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INTRODUCTION

The burrowing isopod *Hemilepistus reaumurii* (Audouin, 1826) is common throughout the arid parts of North Africa and the Middle East (Lincoln, 1970). Its water economy, which contributes to its success in xeric habitats, was studied by Edney (1957) and Warburg (1965). Linsenmair (1972) deals with the ecological significance of its behaviour. The behavioural and physiological mechanisms that enable desert isopods to overcome winter stresses have not previously been studied.

The present study was carried out in the desert area of Sde-Boker, of the central Negev highlands, Israel. Here *Hemilepistus reaumurii* reaches a density of 5 to 18 individuals per m². In this area the mean annual rainfall is 83 mm with great fluctuations between years (25-161 mm) (Evenari, Shanan & Tadmor, 1971). The climate of the central-Negev highlands is that of a temperate desert, with cool winters, warm summers and mean monthly air temperature of 10.8° C to 25.7° C with recorded extremes of 0.2° C to 46.6° C. In the winter ground temperatures drop below freezing point during 15 to 20 nights each year, reaching values of -4° C to -5° C (Evenari et al., 1971).

The life cycle and pattern of yearly activity of *H. reaumurii* which we observed was similar to that described by Linsenmair & Linsenmair (1971) and Linsenmair (1972) from studies in Algeria.

Pair formation took place between February and the end of March, when above ground activity is between 12.00 to 14.00 h.

The young are born in the late spring (April-May) and their growth continues until autumn (September-November). In the summer, above ground activity is bimodal with morning (05.00 to 07.00 h) and evening (18.00 to 20.00 h) peaks (table I).

During the winter, no feeding or above ground activity was observed. Therefore, the aim of this study was to examine the ability of *H. reaumurii* to survive without food under different ambient temperatures.
<table>
<thead>
<tr>
<th>Time</th>
<th>Soil surface range</th>
<th>Burrow range</th>
<th>Activity above ground</th>
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<th>Burrow range</th>
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<th>Soil surface range</th>
<th>Burrow range</th>
<th>Activity above ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.00-05.00</td>
<td>4.5- 2.2</td>
<td>10.0±3.0</td>
<td>—</td>
<td>05.00-07.00</td>
<td>3.0- 7.0</td>
<td>10.0±3.0</td>
<td>—</td>
<td>07.00-18.00</td>
<td>6.0-19.8</td>
<td>10.0±3.0</td>
<td>—</td>
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<tr>
<td>**18.00-20.00</td>
<td>5.0- 9.0</td>
<td>10.0±3.0</td>
<td>—</td>
<td>20.00-01.00</td>
<td>4.0- 7.6</td>
<td>10.0±3.0</td>
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</tbody>
</table>

* Morning above ground activity
** Afternoon above ground activity

Optimum range for above ground activity 16°C-25°C.