The status of *Rattus norvegicus* in Rangoon, Burma

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Abstract: Despite a relatively high prevalence of pregnancy and numbers of embryos produced *Rattus norvegicus* has a very restricted distribution in the city of Rangoon. Significant changes in the distribution of this rat from that reported 30 years ago were not detected. It is suggested that *R. norvegicus* distribution and abundance are related to the presence of large numbers of *Bandicota bengalensis*. The majority (87.2%) of the *R. norvegicus* captured were infested with fleas. Three species of fleas were recovered: *Xenopsylla cheopis*, *X. astia* and *Ctenocephalides felis*. The possible importance of *R. norvegicus* with regard to rodent-borne diseases is discussed.

INTRODUCTION

Only limited information on the distribution and biology of *Rattus norvegicus* in Rangoon is available. Jolly et al. (1930/31) reported *R. norvegicus* present in the port area of Rangoon. Harrison and Woodville (1948, 1949, 1950) stated that this species occurred in the docks and central town areas and that *R. norvegicus* had a limited distribution in Rangoon.

MATERIALS AND METHODS

Animals were captured by use of locally made wooden live traps usually baited with dry fish. Traps were set in a variety of habitats within the city of Rangoon. Animals captured were retained in the trap and brought to the laboratory for examination. There they were anaesthetized, bled by cardiac puncture and combed for ectoparasites. Individual *R. norvegicus* were sexed, measured and weighed. All measurements are given in millimeters and weight in grams. Reproductive condition was noted on all females: perforation of the vaginal orifice, lactation, pregnancy and number of embryos present. A sample was examined for placental scars and corpora lutea.

RESULTS

Forty-five localities were trapped in Rangoon. From eight (17.8%) of these, *R. norvegicus* were captured. The localities trapped and those from which *R. norvegicus* were captured are shown on Fig. 1. The actual locality of capture, number captured, habitats and number of indoor or outdoor captures are shown in Table 1.

Of the *R. norvegicus* captures, sixty-three were females. Twenty-one of these were pregnant. The number of embryos observed ranged from 5–12. The mean number ± one standard deviation was 8.7 ± 2.1 embryos. Of forty-two females examined for placental scars, twenty had one or more sets of scars. Among those with scars, the mean number

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of sets ± one standard deviation was 1.55 ± 0.76. Among the females examined for corpora lutea, the smallest with corpora lutea had a head and body length of 141 mm (not pregnant or lactating and had no placental scars) and the largest had a head and body length of 219 mm (also not pregnant or lactating and had no placental scars).

Female *R. norvegicus* were captured only during the following months: 1975—December; 1976—February, March, June, August, September; 1977—January, February, March. Pregnant females were captured during the months of February, March and June. The sample size from the other months was small and it is quite likely that pregnant females were simply not captured. The ratio of females to males captured was 1 to 1.1.

Of 739 fleas recovered from *R. norvegicus*, three species were represented: *Xenopsylla astia* (55%), *X. cheopis* (44.8%) and *Ctenocephalides felis* (0.2%). Most of the *R. norvegicus* collected (87.2%) were infested with fleas.

**DISCUSSION**

Although the only previously published report on the distribution of *R. norvegicus* in Rangoon is the general statement of Harrison and Woodville (1949), our data do not indicate there has been a significant deviation from that general statement. As

<table>
<thead>
<tr>
<th>Locality (Township)</th>
<th>No. Captures</th>
<th>Habitat</th>
<th>Inside</th>
<th>Outside</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pazundaung</td>
<td>5</td>
<td>office building</td>
<td>5</td>
<td>—</td>
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<tr>
<td>2. Latha</td>
<td>3</td>
<td>mixed urban</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3. Botataung</td>
<td>29</td>
<td>food bazaar</td>
<td>29</td>
<td>—</td>
</tr>
<tr>
<td>4. Dagon</td>
<td>5</td>
<td>living quarters</td>
<td>5</td>
<td>—</td>
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<tr>
<td>5. Ahlone</td>
<td>4</td>
<td>&quot;</td>
<td>4</td>
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<tr>
<td>6. Pabedan</td>
<td>3</td>
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<td>2</td>
<td>1</td>
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<tr>
<td>7. Kyauktada</td>
<td>3</td>
<td>&quot;</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>8. Port</td>
<td>29</td>
<td>office and vessels</td>
<td>29</td>
<td>—</td>
</tr>
<tr>
<td>(Keighley)</td>
<td>38</td>
<td>(bazaar)</td>
<td>38</td>
<td>—</td>
</tr>
<tr>
<td>(Morton)</td>
<td>3</td>
<td>(jetty)</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>(Lanmadaw)</td>
<td>4</td>
<td>(jetty)</td>
<td>4</td>
<td>—</td>
</tr>
<tr>
<td>(Keighley)</td>
<td>7</td>
<td>(rice godowns)</td>
<td>7</td>
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</tr>
</tbody>
</table>

Total 133 131 2
can be seen from Fig. 1, *R. norvegicus* which we captured were from the port area or those townships close to the port. Jolly et al. (1930/31) reported that 11.94% of their captures from the port were *R. norvegicus* and that this species was primarily an outdoor dwelling form. As can be seen from Table 1, all but two of the *R. norvegicus* captured were inside captures and among those captures from the port during this study, *R. norvegicus* represented 22.8% of the total captures (81 of 356).

Why *R. norvegicus* has such a restricted distribution within the city of Rangoon is not known. Certainly, the average embryo count (8.7±2.1) would seem to indicate that the potential production of young is quite high. Also, one-third (21 of 63) of all female *R. norvegicus* captured were pregnant. These two factors are comparable to those reported for *B. bengalensis* in Rangoon (Walton et al., in press). Harrison and Woodville (1948) reported that, except in the limited area where *R. norvegicus* occurred, all rat burrows appeared to be the work of *B. bengalensis*. It may be that where the lesser bandicoot rats have well established burrows, *R. norvegicus* are unable to establish their own burrows and are forced, consequently, into maintaining numerically limited enclaves or into living in more exposed above ground situations.

Harrison and Woodville (1949) reported that among pregnant *R. norvegicus* in Rangoon the number of embryos ranged from 3–9. The observations made during this study indicate the *R. norvegicus* in Rangoon conform to previous observations on number of embryos and percent of females pregnant for the species (Brooks, 1973). Jolly et al. (1930/31) reported a sex ratio of 12 females to one male among *R. norvegicus* trapped in the Rangoon port area. This does not agree with our results, but our efforts were not restricted just to the port and our sample of *R. norvegicus* is smaller. From the port area, Jolly et al. (1930/31) found that *R. norvegicus* constituted about 12% of the total small mammal captures; later, Harrison and Woodville (1950) reported that in the docks and town area *R. norvegicus* represented about 10% of all rats seen. Of all small mammals captured during this survey, *R. norvegicus* represented less than 4% of the total captures. It should be noted, however, that many of the townships now part of urban Rangoon either did not exist at the time of the previous studies or were semirural fringe areas of the city. These newer areas support large populations of other rodent species but no *R. norvegicus* were captured or seen.

Although of limited distribution in Rangoon, *R. norvegicus* has recently been found to be involved in the epidemiology of plague in Rangoon (Brooks et al., in press). Because of its presence in the heavily urbanized areas of the city, the importance of *R. norvegicus* in the public health of the city should not be discounted. Ko Ko (1968) noted an apparent increase in Bandicota bengalensis among the rats present in the port area with a decline in the proportion of *R. norvegicus*. Whether this is, in fact, the case, not only in the port but throughout the city is not known, but the lesser bandicoots did comprise over 50% of more than 3,600 small mammals captured during this study. The high percentage of flea infested *R. norvegicus* indicates that this rodent, within its distribution limits, is important in maintaining substantial populations of fleas with a high vector potential for plague.

This report presents those data on *R. norvegicus* in Rangoon gathered during an intensive survey of the small mammal fauna of Rangoon conducted by the Rodent Control Demonstration Unit of the World Health Organization in cooperation with the Ministry of Health of the Socialist Republic of the Union of Burma.

REFERENCES


ビルマ, ランゴーン市のドブネズミ
Rattus norvegicus の生息状況

ランゴーンでのドブネズミの地理的分布は市内広くに分布しているとはいえない。産仔数、頻度とも大であるにかかわらず、市の港の地区にのみ分布が限定されている。このような状況は Harrison and Woodville (1948, 1950) の報告した 30 年前と大差ない。しかし、その生態は 50 年前の Jolly ら (1930/31) の報告と比べ、今や本種が屋内に棲息する種として定着している点で全く異なる。このような変化は、多分、広く分布する穴居性の Bandicota bengalensis との種間競争によるものだろう。ドブネズミが屋内に出現するようになって人への害は増加しているようなので、ネズミに関与しておこる病気の疫学の研究の重要性は少なくないう。