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Kyoto University


Studies on the Food Habits of Rats V. Feeding Preferences of Some Field Mice for a Scent Rice.

Kiyohisa NAGANUMA, Akira FUTABA** and Yasunosuke IKEDA*** (Department of Medical Zoology, Osaka City University, Medical School*, Technical Research Laboratory, Ikari Disinfection Co., Ltd.** and Sankyo Co., Ltd., Tokyo***) Received March, 17, 1977. Boyu-Kagaku, 42, 111-117, 1977.

In the previous paper1, the authors reported that a variety of scent rice, Hieri was preferred by Norway rats, and the intake of cereal bait mixtures was increased when proper quantity of the scent rice was incorporated into the bait mixture.

In the present paper, the authors report the food preferences of three species of field mice for the scent rice (Hieri) and an ordinary rice (Sasanishiki). The results show that both varieties of rice were taken about equally by Microtus montebelli and Mus musculus, whereas Apodemus speciosus preferred scent rice to ordinary rice even though both varieties of rice were available.

Materials and Method

The animals used were laboratory colonies of Japanese field vole. Microtus montebelli, Japanese field mouse, Apodemus speciosus and Japanese house mouse, Mus musculus which had been reared in the laboratory. In advance of the tests, the infant animals from the same litter were separated from their mother and confined in a large breeding cage every group.

The test baits used were two varieties of rice, Hieri and Sasanishiki. Hieri is a variety of scent rice as mentioned in the previous paper1. Sasanishiki is an ordinary rice which has been popularly consumed by Japanese people. Both varieties of rice were tested in unmilled grains and finely powdered forms.

The test cage is consisted of stainless wire-netting, 26cm \times 30cm, and 17cm in height with a netted door in the side wall. Bait container is consisted of glass dish, 7cm in diameter and 4.5cm in height.

An individually caged rat was allowed to choose a paired baits for 24 hours. Two dishes with the excessive amount of test baits were placed to either corner of the cage at the same time. The baits were renewed and their positions were changed every day to eliminate bias due to place preference.

Results and Discussion

Each test group was consisted of four adult mice of equal sex ratio. Each test was repeated four times. Average daily consumption of the test baits was calculated and indicated per 100g body weight of test animals.

Table 1 shows the preferences of field mice for two varieties of rice grains. There were little differences between Hieri and Sasanishiki in the daily consumption by Microtus and Mus, though Hieri was somewhat preferred when it was mixed with ordinary rice in the lower proportion. Apodemus preferred Hieri to Sasanishiki, but this field mouse did not distinguish scent rice when it was mixed in a low proportion.

Table 2 shows the preference of Apodemus.
Table 1. Comparison of the daily consumption of two varieties of rice grains by three species of field mice in an individual feeding test during four day periods.

<table>
<thead>
<tr>
<th>Test bait Standard rice* plus:</th>
<th>Consumption/100g body w./day</th>
<th>Chi-square Significance p=0.05</th>
<th>Average of body weight (no. of mouse)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test bait</td>
<td>Standard rice*</td>
<td>Total taken</td>
</tr>
<tr>
<td>Hieri 100%</td>
<td>8.1</td>
<td>8.5</td>
<td>16.6</td>
</tr>
<tr>
<td>50</td>
<td>9.2</td>
<td>6.5</td>
<td>15.7</td>
</tr>
<tr>
<td>25</td>
<td>8.9</td>
<td>2.8</td>
<td>11.7</td>
</tr>
<tr>
<td>Hieri only</td>
<td>16.6</td>
<td>—</td>
<td>16.6</td>
</tr>
<tr>
<td>Standard only</td>
<td>—</td>
<td>14.5</td>
<td>14.5</td>
</tr>
</tbody>
</table>

**Microtus montebelli**

| Hieri 100%                    | 6.2       | 4.3            | 10.5        | 16 | *                         | 40.0(4)                     |
| 50                             | 6.0       | 4.2            | 10.2        | 16 | *                         | 42.0(4)                     |
| 25                             | 6.5       | 6.2            | 12.7        | 16 | N.S.                      | 40.0(4)                     |
| Hieri only                     | 11.9      | —              | 11.9        | 8  |                           | 42.0(4)                     |
| Standard only                  | —         | 10.1           | 10.1        | 8  |                           | 42.0(4)                     |

**Apodemus speciosus**

| Hieri 100%                    | 9.1       | 11.2           | 20.3        | 16 | N.S.                      | 17.0(4)                     |
| 50                             | 13.6      | 12.5           | 26.1        | 16 | N.S.                      | 16.8(4)                     |
| 25                             | 12.7      | 8.7            | 21.4        | 16 | *                         | 18.5(4)                     |
| Hieri only                     | 21.7      | —              | 21.7        | 8  |                           | 16.8(4)                     |
| Standard only                  | —         | 19.9           | 19.9        | 8  |                           | 16.8(4)                     |

| Mus musculus                  |           |                |             |    |                           |                             |
| Hieri 100%                    |           |                |             |    |                           |                             |
| 50                             |           |                |             |    |                           |                             |
| 25                             |           |                |             |    |                           |                             |
| Hieri only                     |           |                |             |    |                           |                             |
| Standard only                  |           |                |             |    |                           |                             |

* Sasanishiki used as a standard rice.

for the bait mixtures in various proportions of powdered rice and wheat flour. There were no significant differences in the amount of daily consumption among the test baits.

Nevertheless, *Apodemus* seems to prefer bait with higher proportion of scent rice in the bait mixture. It is a clear evidence that this field mouse preferred Hieri to Sasanishiki when both rice grains were compared at the same time as shown in Table 1.

Tables 3 and 4 show the preferences of *Mus musculus* and *Microtus montebelli* for the test baits. Although there were considerable differences in the results of the feeding tests, empirically it may be considered that there was little or no difference in the daily consumption between each paired baits. The statistical differences may be due to the wide variations appeared occasionally in the amount of consumption between the test baits. In spite of the bait positions were changed every day to eliminate the possibility of bias due to place preference, there was prejudice in favor of either of the paired baits so that mice taken whichever bait capriciously.

The results have suggested that rice is less attractive for these mice, and it may be available
Table 2. Daily bait consumption of Japanese field mouse, *Apodemus speciosus* when each paired baits was provided for four days.

<table>
<thead>
<tr>
<th>Test bait Wheat flour plus:</th>
<th>Consumption/100g body w./day</th>
<th>Chi-square Significance p=0.05</th>
<th>Average of body weight (no. of mouse)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test bait</td>
<td>Wheat flour</td>
<td>Total taken</td>
</tr>
<tr>
<td>Hieri 0.5%</td>
<td>4.7</td>
<td>5.9</td>
<td>10.6</td>
</tr>
<tr>
<td>1.0</td>
<td>5.3</td>
<td>5.2</td>
<td>10.5</td>
</tr>
<tr>
<td>5.0</td>
<td>7.0</td>
<td>4.9</td>
<td>11.9</td>
</tr>
<tr>
<td>10.0</td>
<td>8.1</td>
<td>4.1</td>
<td>12.2</td>
</tr>
<tr>
<td>20.0</td>
<td>8.6</td>
<td>4.3</td>
<td>12.9</td>
</tr>
<tr>
<td>Sasanishiki</td>
<td>5.8</td>
<td>5.3</td>
<td>11.1</td>
</tr>
<tr>
<td>1.0</td>
<td>6.9</td>
<td>5.8</td>
<td>12.7</td>
</tr>
<tr>
<td>5.0</td>
<td>6.6</td>
<td>5.0</td>
<td>11.6</td>
</tr>
<tr>
<td>10.0</td>
<td>7.6</td>
<td>4.4</td>
<td>12.0</td>
</tr>
<tr>
<td>20.0</td>
<td>7.0</td>
<td>5.9</td>
<td>12.9</td>
</tr>
</tbody>
</table>

* Sasanishiki used as a standard rice.

Table 3. Daily bait consumption of Japanese house mouse, *Mus musculus* when each paired baits was provided for four days.

<table>
<thead>
<tr>
<th>Test bait Wheat flour plus:</th>
<th>Consumption/100g body w./day</th>
<th>Chi-square Significance p=0.05</th>
<th>Average of body weight (no. of mouse)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test bait</td>
<td>Wheat flour</td>
<td>Total taken</td>
</tr>
<tr>
<td>Hieri 0.5%</td>
<td>12.2</td>
<td>10.4</td>
<td>22.6</td>
</tr>
<tr>
<td>1.0</td>
<td>13.6</td>
<td>12.2</td>
<td>25.8</td>
</tr>
<tr>
<td>5.0</td>
<td>15.2</td>
<td>9.7</td>
<td>24.9</td>
</tr>
<tr>
<td>10.0</td>
<td>14.6</td>
<td>13.1</td>
<td>27.7</td>
</tr>
<tr>
<td>20.0</td>
<td>15.5</td>
<td>8.0</td>
<td>23.5</td>
</tr>
<tr>
<td>Sasanishiki</td>
<td>12.9</td>
<td>11.7</td>
<td>24.6</td>
</tr>
<tr>
<td>1.0</td>
<td>10.9</td>
<td>15.0</td>
<td>25.9</td>
</tr>
<tr>
<td>5.0</td>
<td>18.5</td>
<td>10.4</td>
<td>28.9</td>
</tr>
<tr>
<td>10.0</td>
<td>13.3</td>
<td>15.7</td>
<td>29.0</td>
</tr>
<tr>
<td>20.0</td>
<td>18.8</td>
<td>8.4</td>
<td>27.2</td>
</tr>
</tbody>
</table>

* Sasanishiki used as a standard rice.
Table 4. Daily bait consumption of Japanese field vole, *Microtus montebelli* when each paired baits was provided for four days.

<table>
<thead>
<tr>
<th>Test bait flour plus:</th>
<th>Test bait</th>
<th>Wheat flour</th>
<th>Total taken</th>
<th>n</th>
<th>Chi-square Significance p=0.05</th>
<th>Average of body weight (no. of mouse)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hieri</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5%</td>
<td>9.5</td>
<td>9.4</td>
<td>18.9</td>
<td>16</td>
<td>N.S.</td>
<td>31.0(4)</td>
</tr>
<tr>
<td>1.0</td>
<td>8.3</td>
<td>10.3</td>
<td>18.6</td>
<td>16</td>
<td>N.S.</td>
<td>26.5(4)</td>
</tr>
<tr>
<td>5.0</td>
<td>13.1</td>
<td>8.9</td>
<td>22.0</td>
<td>16</td>
<td>*</td>
<td>28.8(4)</td>
</tr>
<tr>
<td>10.0</td>
<td>13.6</td>
<td>4.0</td>
<td>17.6</td>
<td>16</td>
<td>*</td>
<td>30.5(4)</td>
</tr>
<tr>
<td>20.0</td>
<td>15.2</td>
<td>6.0</td>
<td>21.2</td>
<td>16</td>
<td>*</td>
<td>28.8(4)</td>
</tr>
<tr>
<td><strong>Sasa</strong>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5%</td>
<td>8.9</td>
<td>5.1</td>
<td>16.0</td>
<td>16</td>
<td>*</td>
<td>29.3(4)</td>
</tr>
<tr>
<td>1.0</td>
<td>5.7</td>
<td>7.8</td>
<td>13.5</td>
<td>16</td>
<td>*</td>
<td>29.3(4)</td>
</tr>
<tr>
<td>5.0</td>
<td>9.6</td>
<td>7.4</td>
<td>17.0</td>
<td>16</td>
<td>*</td>
<td>29.8(4)</td>
</tr>
<tr>
<td>10.0</td>
<td>15.6</td>
<td>4.6</td>
<td>20.2</td>
<td>16</td>
<td>*</td>
<td>29.0(4)</td>
</tr>
<tr>
<td>20.0</td>
<td>14.6</td>
<td>5.2</td>
<td>19.8</td>
<td>16</td>
<td>*</td>
<td>28.8(4)</td>
</tr>
</tbody>
</table>

* Sasanishiki used as a standard rice.

as a staple food for them. If remotely compared, the addition of 5 to 25% of scent rice may increase the acceptability of the cereal bait mixtures.

The authors wish to express their appreciation to Prof. S. Takada, Dept. of Med. Zool., Osaka City Univ. for his kind guidance during the present work.

**Summary**

To know the food preferences of three species of field mice for a scent rice, some feeding tests were carried out in the laboratory conditions.

The results showed that a scent rice, Hieri is attractive for Japanese field mouse, *Apodemus speciosus* when it used as a grain or a bait with higher proportion of scent rice in the bait mixture. Hieri is less attractive for Japanese house mouse, *Mus musculus* and Japanese field vole, *Microtus montebelli*, while it may be available as a bait enhancer when the proper quantity of the powdered rice is added to the bait mixture.

**References**
