

## The rodents written in “Chin-gan-Sodate-gusa”:<sup>1</sup> - Review of an old Japanese book on breeding and genetics of mice -

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### Preface

Here, we introduced “Chin-Gan-Sodate-Gusa” published in 1787, Horeki period (1750~1763) of Edo era. Until now this book has been introduced by the researchers such as Tokuda,<sup>2</sup> Kihara,<sup>3</sup> Shinoto,<sup>4</sup> Kondo,<sup>5,6</sup> Hayakawa,<sup>7</sup> Yonekawa and Moriwaki,<sup>8</sup> etc. They introduced about breeding and genetics of mice. The author endeavored to completely describe the “Chin-Gan-Sodate-Gusa” in the modern orthography with a high-fidelity because of it was written in a orthography different from that of our times.<sup>9</sup>

### BACKGROUND

Mice in one’s house are believed to be predictive of the future. It is believed that when mice gather, good fortune follows. The mouse is the first of the 12 signs in the Chinese zodiac.<sup>10</sup>

With regard to divinatory signs, or “Ke”, according

to the Chinese *Eki* belief system, mice belong to the “Kon” sign.<sup>11</sup> Three thousand years of relationships between humans and mice have led to the belief that the human soul possesses the soul of a mouse, enabling humans to know the vicissitudes of fortune and to sense events occurring far away.

Nowadays, an increasing number of people keep mice as pets,<sup>12</sup> which is an auspicious sign of favorable times ahead. In fact, a book on this has been written in January of the 7<sup>th</sup> year (the “Year of Sheep” in the zodiac calendar) of Tenmei period<sup>13</sup> by *Tei-en-shi*.<sup>14</sup>

### The origin of the white mouse<sup>15</sup>

Modern-day people sometimes call an unusually able domestic helper a “white mouse”. This name originated in a white mouse with black eyes which *Ingen-zenji*,<sup>16</sup> a Chinese Buddhist priest and the founder of *Obaku-san* temple, brought to Japan to amuse himself in autumn of

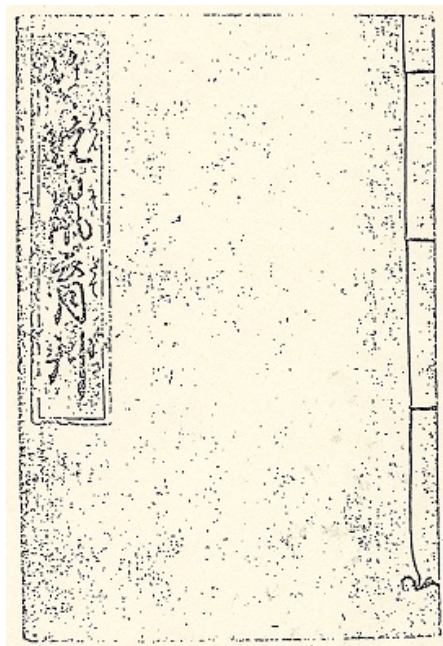


Fig. 1: The front cover of “Chingan-sodate-gusa”



Fig. 2: A child playing with a mouse on his palm.

the 3<sup>rd</sup> year of *Shoou*:<sup>17</sup> i.e. during the reign of the 111<sup>th</sup> Emperor *Gokoumyo*.

As a result, more and more worshippers of the sect were subsequently influenced by the practice, and many were eager to have the same kind of mouse when they visited the temple.

There-of, having a white mouse in a house was a symbol of wealth and harmony: i.e. the wealthier the financial status, the more harmonious was the family (down from the head to the servants). Such a house would soon grow in wealth, become great, and the descendants would prosper as well. It is strongly believed that a white mouse with black eyes is a messenger of *Daikokuten*, the god of wealth.

To enjoy happiness of wealth one should pray on the day assigned to the mouse on the Chinese calendar. The mouse is also said to be 'in charge' of controlling the direction of north (positive pole) and the negative pole. Or in other words, capable of showing the principles of the positive and the negative (*Yin-Yan*) as well as those of the virtue and the return. Furthermore, from the first mouse bears numerous babies that promote the filial piety by perpetuity of descendants, and in so doing make people even healthier in spite of

aging.

It is therefore the best way to admire uniqueness of white mouse (mentioned above) prior to the description of various other types of rare mice.

### Nicknames of various rare mice

Herein, I introduce the nicknames of the 15 other rare mouse types now raised as pets by people with pleasure: spotted (*Buchi*), black-spotted (*Kuma-buchi*), wisteria (*Fuji*), white-lined (*Tuma-jiro*), two-tone (*Kuguri*), spotted only on the head (*Kasira-buchi*), wisteria-lined (*Fuji-no-suji*), mono-tone (*Muji*), ibis-colored (*Toki*), thistle-colored (*Azami*), moonlike-spotted (*Tsuki-no-Buchi*), beanlike-spotted (*Mame-no-buchi*), white body with red eyes (*Me-aka-no-shiro*), striped (*Suji*), white body with black eyes (*Kuro-me-no-shiro*) (Fig. 3, 4). 'Buchi' means generally 'spotted' (Fig. 2: In the picture a sentence with the same meaning is indicated). Besides the above-mentioned, mice people value them highly for their fur color which will be introduced later on with regard to their goodness or badness when they are born.

Generally, it is instructed to keep a pregnant female mouse should be kept in a separate box. Having become pregnant, a female mouse would refuse to let male mice

月の ら	頭 ら	ぬ ち	諸 鼠 の 異 名 今 法 人 持 お そ ふ 十 八 筋 の 大 概
豆 ゆ ら	後 の 筋	熊 ゆ ち	
月 赤 白	む と	ぬ と	
と と	と き	赤 白	
の 黒 眼 白	あ ご み	く ご み	

Fig. 3: A list of rare-coloured mice highly valued at the time.

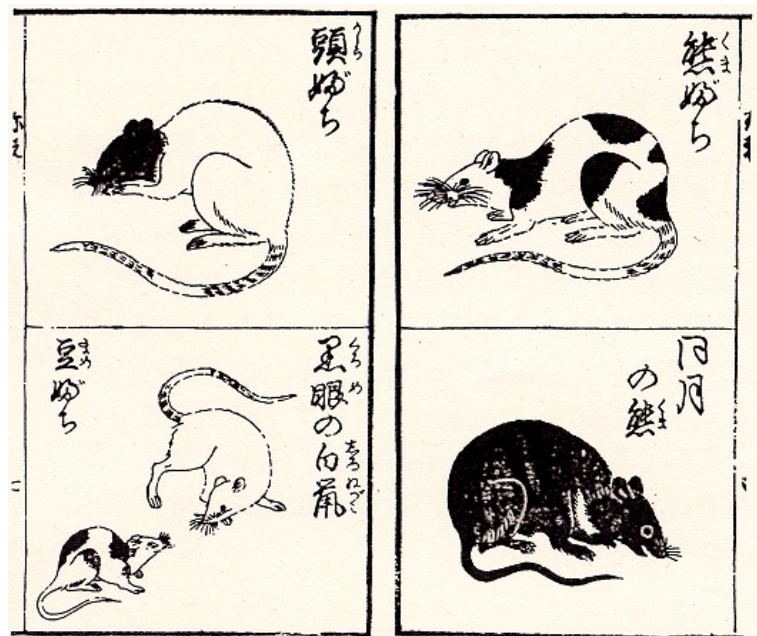


Fig. 4: Photographs of rare mice. Three types of mottled mice as well as a white mouse with black eyes and a mini-sized mouse.



get close to her. When she shows that behavior, she should at once be moved to a separate breeding box.

### Things to be aware of when offspring of mice are born

The breeding box for a female mouse about to give birth should be spacious enough to accommodate the maternal mouse and her offspring. The first litter<sup>18</sup> she gives birth to contain usually from only a few to up to four or five offspring, while the second or third litter may include as many as seven or eight. Litters with more than 4-5 accommodated in a small box might have some crushed to death. From the end of August to about April, some straw<sup>19</sup> should be laid out on the floor of a breeding box, while straw should not be placed there from about May to the end of the hot season (around August). However, it is always useful to lay out straw in the accommodation box regardless of the temperature if a female mouse is pregnant.

Without straw the babies will not grow well. The date of birth should be registered and the newborn should stay with the parent for about twenty days (four or five days more in the cold season).

### Mini-sized white mice and mini-sized spotted mice

A mini white female mouse should be kept with her male partner even after pregnancy. If the pair is separated, the parturition time would be delayed. Additionally, it would be more efficient and useful to keep the pair together by feeding them the same animal feed.

### Feed in a daily life and in the hot or cold season

Black rice<sup>20</sup> should be available all the time in the box. Feed, which should be supplied two or three times a day, consists of boiled rice. One must be certain not to run out of black rice in the box. At the end of June and in July, the most important thing to do is to supply adequate water. From spring to the end of September, grated radish and green vegetables should be made available ad libitum.

### How to raise mice to become robust

The important thing to do is to feed the mice grilled river fish such as gudgeons broken into pieces; the amount may not be much (3-4 g/day) but should be given daily. In doing so, mice become very robust and bear offspring sooner. However, raw fish and sugar are very harmful to rat health, and should be avoided.

### Proper and improper animal feed

Grilled river fish, croton seeds,<sup>21</sup> salt, and green vegetables are nutritious and healthy for mice, while raw fish, 'machin',<sup>22</sup> pepper, and 'hisou',<sup>23</sup> are very unhealthy, and should not be given to mice.

### Differentiating male from female mice

It is not so easy to differentiate the mouse gender. Briefly, lay a mouse in the supine position, and observe it by holding the tail down: a mouse has its first pit (genital) fairly

distant (3-4 mm) from the second pit (anus)<sup>24</sup> is a visible indication of a male, although in cases of blackish mice, the testicles may be easily found. A female mouse has one pit, and under it only a line can be seen without a second pit. This is the method to differentiate the mouse gender.

### The secret method of breeding some original stocks of mice

- Black-spotted (*Kuma-buchi*) parents have black-white-mottled babies, among which there may be a wisteria offspring if the parents have repeatedly given birth.
- A white female mice crossbred with a black-spotted male will bear thoroughly black offspring. These are called black mice from a white mother (*Tsuma-jiro*) or previous generations (*Kuguri*). If a female of this kind is bred for about four months and crossed with a black-

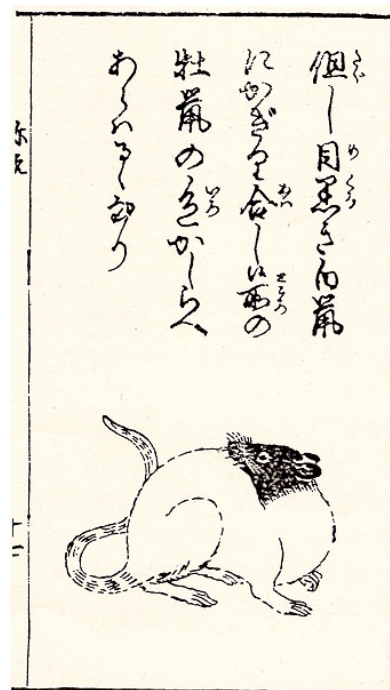


Fig. 5: The special cover of the paragraph on the secret method of breeding certain original stocks of mice. This cover and the letters larger than those of the other paragraphs make it clear that the author attached greater importance to this paragraph.

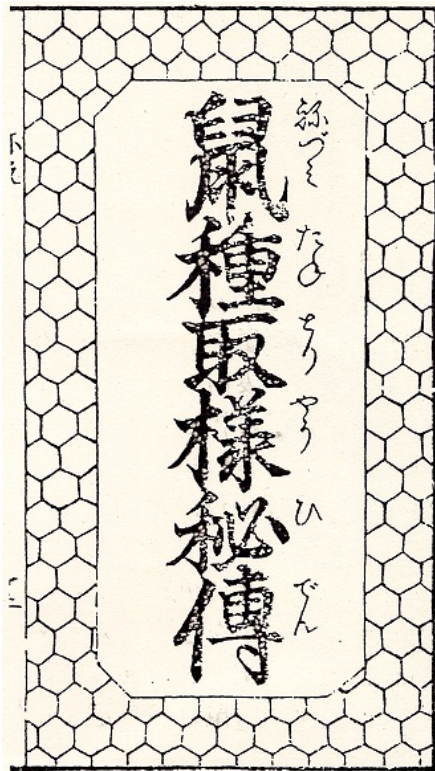


Fig. 6: An explanatory picture of the fourth item in the paragraph on the secret method of breeding certain original lines of mice.

spotted male mouse, it will bear black offspring with a white belly or with a moon-bearing mark.

- Choose from among black-spotted mice when a pair of male and female of pretty whitish and light-spotted color are allowed to mate and have the same pair-mating process repeated, the second pair then produce white mice with black eyes. These are – in fact - the very same white mice valued highly throughout the world. White mice with red eyes cannot be called ‘white mice’. Red eyes in spite of the white body are caused by the color of blood, as it is true of most animals. The so-called ‘white mice’ must be the ones with black eyes.
- Both male and female white mice with black eyes bear the same white mice with black eyes, and when a thus produced female offspring is paired with a male mouse of any other color, white offspring are produced, where only the head has the same colour as the father’s body (Fig. 6). Only the white-fur father with black eyes can produce babies with a white head.
- A piebald female mouse with black eyes paired with a white male with black eyes sometime bear a white offspring where only the head is light purple.
- A white female with black eyes paired with a wisteria male bear white offspring with dark red eyes.
- A pair of pale pink (‘*Toki-iro*’) mice (‘*Muji-mono*’) bear pale pink offspring. One female of these

paired with a male of the same kind bear thistle-colored offspring. There must be many people who have not seen thistle-colored mice. Considering such points, we hope this review will be of value for reading/sharing. Other rare mouse than the ones mentioned here may sometimes be produced through proper mating. Basically, this review aims to increase the appreciation of these rare types of mice.

#### Native mice

Native house-mice (*Tana-nezumi*)<sup>25</sup> living in great numbers should never be bred together with the other types of mice.<sup>26</sup> Native mice are so violent that they cannot co-exist with the others.

#### Other rare mice

It is not easy to preserve a stock of rare mice, especially if they are exceptional with regard to their need exercise. Rare-colored mice whose stock can be preserved without much difficulty are generally not fully established.

The latter part of this review will shortly be published elsewhere:<sup>27</sup> A secret method of stock-breeding for red, light yellow, and light green mice<sup>28</sup> will be described in the publication. In addition, a way to call for return of mice, which have run away, will be also explained. Some of the previous findings have been published before the new year’s day of the 7th year of ‘*Tenmei*’ -period, at the southern district of the crossing of *Horikawa*-street and *Takatsuji*-street by *Zeniya Choubei*.<sup>29</sup>

#### Competing Interests

Authors have declared that no competing interests exist.

#### Notes & References

1. If it is read literally, the title in Japanese should be ‘*Chinganso-sodate-gusa*’, but the publisher of the book gave it the pronunciation: ‘*Chingan-sodate-gusa*’ in phonetical characters as shown in Fig. 1.
2. Tokuda M. 1935. An eighteen century Japanese guide-book on mouse-breeding. *J. Hered* 26, 480-484.
3. Kihara H. 1968. *Nihon ni okeru seibutugaku narabini kannren shokagaku no shiteki Tenkai* (in Japanese). *Iden*. 22 (21); 4-11.
4. Shinotoh K. 1970. *Nihon ni okeru shinkagaku to idenngaku tonno hattatu* (in Japanese). *Iden*. 2 (3); 70-73.
5. Kondo K. 1976. *Oedo nimo ita buti mausu* (in Japanese). *Kagaku -Asahi*. 1; 48-50.

6. Kondo K. 1986. Aigan doubutu to siteno nezumi (in Japanese). *Kagaku -Asahi*. 3 (2), 42-43.
7. Hayakawa J. 1987. *Chingan-sodate-gusa*' kou (in Japanese). *Laboratory Animal*. 4 (1), 3-33.
8. Yonekawa H. and Moriwaki K. 1986. Jikken you mausu no kako to mirai (in Japanese). *Tanpakushitu -Kakusan -Kohso.*, 31(2) 1151-1170.
9. Nishikawa T. 1990. '*Chingan-sodate-gusa*' ni toujyou suru nezumi tati (in Japanese). *Shizuoka Experimental Animals Research Association Reports* (in Japanese). 17 (33); 9-13.
10. There are 12 signs in the Chinese zodiac: the rat, ox, tiger, rabbit, dragon, snake, horse, sheep, monkey, cock, dog, and boar.
11. In the Chinese Eki-belief system there are eight divinatory signs or '*Ke*': namely, '*Ken*', '*Da*', '*Li*', '*Shin*', '*Son*', '*Kan*', '*Gon*', '*Kon*'. These signs are all together called '*Hakke*' (eight-*Kes*) and present 64 cases under different combinations. One's fortune can be told using divining sticks ('*Sangi*')'*Ke*'. '*Kon*' indicates that things hardly move and symbolizes a mountain, a small brother, and the northeast as the direction.
12. On the basis of the phrase: "Recently...again." Kondo<sup>5</sup> conjectures that rat-breeding must have been customary since olden times.
13. A.D. 1787 in *Edo*-era.
14. This is supposed to be the author of the text, but it cannot be confirmed whether the text is identical to the publisher.
15. According to Hayakawa<sup>7</sup> this paragraph explains where the custom of calling a head clerk ('*Banto*') a white mouse, comes from the origin of the mouse being valued highly in the *Edo* era.
16. A Chinese Buddhist-priest (1593-1673) who established the Japanese *Obaku*-sect. Born in *Fuchou* of the *Ming*-dynasty China, he came to Japan, lived near Kyoto and founded *Obakusan-Manpukuji*-temple in present day Uji city in Kyoto prefecture.
17. A.D.1654 in the *Edo* era.
18. Offspring from her first birth.
19. Straw is supposedly used as the material of their nest.
20. Black rice means rice which is not yet polished.
21. Croton, called also '*hatou*', is the name of a tree belonging to the spurge family. The fruits of the tree, similar to beans, include kernels which can bring forth croton oil.
22. A corrupted word originated from southern Chinese.
23. '*Hisou*' may mean arsenic.
24. A new-born or young mouse where the reproductive organ of a male is found more distant from the anus than that of a female.
25. Hayakawa<sup>7</sup> suggests that this may be a black rat(*Rattus rattus*), judging from a nuance of the word.
26. 'Mice' kept as pets is meant here.
27. It is not known if any copy of this book has remained to the present day.
28. Kondo<sup>4</sup> suggests that the descendants of these rats should belong to the yellow mice which are now made use of as experimental models for diabetes research, judging from the body color.
29. Tokuda<sup>2</sup> identifies this person as the author, although his personal history is not recorded, and surmises that he must have been a financial merchant, judging from his name '*zeni*' (meaning money in Japanese).