

## Notes on some small Mammals of Malaya

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Very little seems to be recorded about the food and habits of the small mammals of Malaya, and therefore little apology is needed for the varied and miscellaneous nature of these notes. In the course of studies of the hosts of the mite-vector of Scrub Typhus scraps of information have been acquired which range over a wide field. They do not form a complete study, but they are put on record in the hope that they will form a nucleus to which others may add. It seems very likely that a lot of information of this sort is hidden away in the notebooks and memories of observers throughout Malaya, observers whose primary interest is perhaps elsewhere. We, in this Unit, should be grateful for any such notes, however trivial they may seem.

A large part of these notes consists of observations on animals kept in cages. In such circumstances the feeding habits are likely to be unusual, particularly as unaccustomed foods are offered. It is our custom to offer captive animals various fruits and vegetables readily obtainable in the markets of Kuala Lumpur, and the fact that an animal may accept and thrive upon such food does not indicate that it is accustomed to it, or even meets with it in nature. Nevertheless we consider that such observations are of value in indicating the general nature and texture of the food normally eaten.

Other sources of information are: personal observations in the field, reports of sakai trappers and others, and examination of the stomach contents of dead animals. Our field observations have not been extensive, and the reports of trappers often prove surprisingly inaccurate, but reliable information is hardly to be expected since many of the animals are nocturnal and the diurnal ones are by no means easy to watch. One of us has vivid memories of watching, at quite close range, a Greater Tree Shrew, *Tupaia glis*, apparently feeding on the berries of Straits Rhododendron, *Melastoma malabathricum*. Examination of the fruits immediately afterwards, however, showed that the pulp was untouched, but that all the fruits were being visited by a dull-black ant, and it was presumably this that the Tree Shrew had been eating.

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Perhaps the most reliable information is that obtained from the examination of stomach contents and, to a lesser extent, of droppings. To this method however there are serious drawbacks. Only the harder parts, such as bones, beetle elytra, and hard seeds, are identifiable in the droppings and lower intestines; while rodents triturate their food so thoroughly that the identification of even freshly eaten food in the stomach may resolve into an examination of starch grains and fibres which are little known in themselves. Of overriding importance however is the method of capture of the animal; those caught in live-traps usually have the stomach full of bait, so that stomach examination is only suited to those shot or trapped in break-backs or gins. The rapidity of decay and the ravages of ants makes these traps undesirable in a country such as Malaya, while the preoccupation of this Unit with parasites which will leave a dead host makes it important that animals be trapped alive.

In addition to food we have included notes about the habits of the animals in captivity and, whenever possible, the name by which it is known to our trappers. These trappers are mostly Senoi living in the Ulu Gombak, Ulu Langat, and Bukit Lagong Forest Reserves, who call themselves "Wong", but one is a member of the "Selangor Sakai" living in the Bukit Lanjan Reserve. They speak to us in Malay, and some of the names are evidently Malay names or expressions, others are probably names in their own language for which there is no Malay equivalent, and some are onomatopoeic.

They do not always agree on the names, so the Wong name is indicated by (w) and the Selangor Sakai name by (s).

### RODENTIA

*Hylopetes sagitta* (Linn.).

Flying Squirrel.

Trapper's name (s) *tupai senok*, from its habit of living in tree holes, *senok* meaning a hollow tree.

This is the only flying squirrel of which we have seen any number. We found them difficult to keep alive and our greatest success so far died after 26 days apparently as a result of sepsis of an accidental wound of the hindfoot.

In captivity they accepted soft fruit such as banana and papaya only. The Sakai say that they feed on the fruit of *bankong*. (? *Artocarpus champeden*, a relative of the bread-fruit).

They seem nocturnal, although captive specimens were sometimes active early in the morning, and spent the day curled up in a nest of cotton wool. When active the carpal spur was

folded back along the foreleg so that the patagium was inconspicuous; the feather-shaped tail was carried pressed forward against the sacral region with the tip turned backwards so that, viewed from the side with the animal facing right, it made a figure 2 the tail forming the curl and the body the horizontal base. All specimens were gentle and easy to handle.

*Iomys horsefieldii* (Waterhouse). Flying squirrel.

Only one specimen of this handsome flying-squirrel has been seen, a pregnant female. It was unusually tame, and submitted to handling from the first. It accepted soft fruits of all kinds, and also tapioca<sup>1</sup> and a little sweet-potato. Food was usually held in the fore-paws for eating, but occasionally a hindfoot was used. The squirrel was strictly nocturnal.

This specimen lived a month in captivity and seemed in good condition until the birth of two youngsters, when it became very sick and both mother and family died after a few days. The patagium was well developed in the young from birth.

*Callosciurus tenuis* (Horsfield). The Slender Little Squirrel.

Trapper's name (w) *tupai chole* from the name of a fruit.

Captive specimens thrive on a variety of fruits, sweet-potato, and tapioca. In the field we have watched them eating acorns and both pulp and seeds of durian.

Our specimens were active all day, and rather fierce, spitting at strangers rather like a cat, although they become tame with their friends.

*Callosciurus lowi* (Thomas). Low's Little Squirrel.

Trapper's name (w) *chong* (not *tupai chong*).

The word *chong* seems to be a generic one for the ground squirrels; note its use in combination for *Lariscus*, *Rhinosciurus*, and the tree-shrews *Tupaia*.

In captivity they thrived on a variety of soft fruit, and one specimen developed a liking for sweet-potato. They would accept a little groundnut but they refused rice and various dried beans.

This squirrel is uncommon, and we have not seen it in nature. The trappers say that it spends most of its time upon the ground. In captivity it is active during the day, and when frightened makes a shrill *shree-ee*.

<sup>1</sup> Tapioca is here used in the Malayan sense of the fresh tubers of *Manihot utilitissima*, and not in the more usual English sense of the dried starchy preparation made from them.

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*Callosciurus caniceps* (Gray). Grey-bellied Squirrel.

Trapper's name *tupai taratak*, apparently onomatopaeic from its harsh alarm note.

*Callosciurus nigrovittatus* (Horsfield). Black-banded Squirrel.

Trapper's name (s) *tupai kerol* (w) *tupai enggort* from the name of a fruit.

*Callosciurus notatus* (Boddaert). Common Red-bellied Squirrel.

Trapper's name *tupai merah* the red squirrel, from its red venter.

The last three species are very similar in size, habits, and abundance. They feed on a variety of nuts, hard and soft fruit, and in captivity sweet-potato and tapioca. One pet *C. notatus* of our acquaintance had an especial liking for the petals of garden Cannas. They are active during the day. Young specimens are easily tamed, but it is noticeable that *C. notatus* which is common in inhabited areas, is much more bad-tempered when trapped than either of the other two species.

*Lariscus insignis* (Cuvier). Striped Ground-squirrel.

Trapper's name (w) *chong tün*, probably onomatopaeic from its whistle.

This squirrel seems to live entirely upon the ground. In captivity specimens seemed to prefer sweet-potato, although banana, tapioca, groundnuts, and green gram, were accepted. Plenty of water was taken.

Our specimens were active during the day, but rather sluggish compared with other squirrels. From time to time one would utter a whistle of falling pitch and of a quality curiously like the pea-whistle of a railway guard. They were gentle and easily tamed.

*Rhinosciurus laticaudatus* (Müller). Shrew-faced Ground-squirrel.

Trapper's name *Chong bunga*, the flower *chong*, presumably in reference to the short but very busy tail which is carried with the fur fluffed out like a giant catkin.

Like *Lariscus*, this squirrel seems to live entirely upon the ground. It is remarkable for its long *Tupaia*-like snout, its small incisors, and its long tongue.

In captivity they fed almost entirely upon insects, although a little banana was accepted. One specimen would eat about thirty grasshoppers and a dozen earthworm a day, with plenty of water. Curiously enough our trappers insist that they feed upon fruit, presumably because they can be trapped with a

fruit bait. The long tongue, reduced incisors, and their habit of frequenting fallen trunks, suggest a diet of termites and beetles, which conclusion agrees with the observation of Robinson and Kloss (1909) that the stomachs examined contained large ants and beetles.

Our specimens were active in the early morning but spent most of the day resting with the head tucked under the neck. They seemed gentle and easily tamed. When annoyed they made a hissing noise.

*Rhizomys sumatrensis* (Raffles).

Bamboo Rat.

Trapper's name *dekan*.

At first captive adult specimens refused any food but bamboo-shoot, on which they are said to feed, but having accustomed themselves to sweet-potato they seemed to thrive upon it and prefer it to any other vegetable. Young specimens proved more tractable and accepted sweet-potato at once. All enjoyed gnawing bones. They seemed unable to lap from a dish but confined themselves to licking the wet edge.

When frightened these animals adopted a threatening attitude with the head raised and mouth agape to display the enormous incisors; in this position they uttered a kind of barking grunt. If seized by the body however they were quite helpless, being unable to twist the neck much; presumably the threatening attitude was for use in a tunnel or burrow entrance. After the initial shock of capture they showed themselves as peaceable, friendly, and rather lazy animals. They seemed to show no marked preference for day or night. Unexpectedly for such an obviously burrowing animal some of our specimens liked to climb the bars of the cage and go to sleep in a vertical position hugging the bars or even hanging upside down from the roof for short periods.

*Chiropodomys gliroides* (Blyth).

Tree Mouse.

Trapper's name *tikus kending* in reference to the holes made in bamboo.

These little creatures live in the internodes of Bamboos. A hole is made near the top of an internode, several chambers are joined by biting through the nodes and a nest of leaves is made at the bottom of an internode.

In captivity specimens thrived on sweet-potato, banana, and green vegetables, but rejected rice, green-gram, and ground-nuts. Although so small they were remarkably fierce, and our specimens showed little sign of taming after as much as a year in captivity. When approached they would rear upright and chatter their teeth at the intruder. When un-friendly

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specimens were put together a furious fight would ensue and the loser was usually partly eaten. They were more active at night than during the day.

*Rattus canus* (Miller). Grey Tree-rat.

Trapper's name (w) *tikus legong* after a fruit, and also (s) *tikus tupai* in reference to its strictly arboreal habits. Perhaps there is some connexion between this name *legong* and *Bukit Lagong* where they are common.

In captivity they thrived on bananas and sweet-potato; quite a wide range of foodstuffs was acceptable however including rice, groundnuts, and green-gram. The animals were active and not very good tempered, in marked contrast to *Rattus bowersi* which they resembled remarkably in colouring. They were nocturnal and spent most of the day sleeping.

*Rattus rattus* *Rattus exulans* and *Mus musculus*. House rats and mice.

The food of these domestic species is not remarkable. Our trappers seem to refer to them all as *tikus lebong* or *tikus lebong tana* and sometimes other names. *Rattus rattus argentiventer* however is referred to as *tikus ayer*, a name which we believe is derived by confusing this rat with *Rattus mülleri* q.v.

*Rattus annandalei* (Bonhote). Annandale's Rat.

Trapper's name *tikus tungul*, meaning a tree stump, a name also used for *R. rattus* from which it is not clearly distinguished.

In captivity they thrived on sweet-potato and tapioca. They seemed to have no fear when first trapped, but they were easily frightened.

*Rattus mülleri* (Jentink). Müller's Giant-rat.

Trapper's name (ws) *tikus ayer*, the water rat because it is said to live on the banks of streams, and feed on water snails and crabs, while another form is said to live in trees. We cannot distinguish these forms.

In captivity it was a general feeder, and drank plenty of water. It seemed rather a lazy rat, and was reasonably good natured. It was nocturnal.

*Rattus bowersi* (Anderson). Bowers' Giant-rat.

Trapper's name *tikus geru*.

In captivity this rat was a general feeder, accepting anything offered such as bananas, papaya, sweet-potato, tapioca, green vegetables, rice both raw and boiled, rolled oats, groundnuts, and meaty bones. It is remarkable as the tamest rat which we have yet seen. Specimens freshly trapped would

allow themselves to be handled with no more than a few protesting squeaks, they would eat out of a hand, and when tickled behind the ear or the angle of the jaw they would roll onto their backs and go to sleep. Being, like *Rattus mülleri*, both lazy and nocturnal, specimens spent most of the day sprawling in one corner of the cage, often indeed on their backs with the feet in the air.

*Rattus cremoriventer* (Miller). Pencil-tailed Tree-rat.

Trapper's name *tikus gu'o*.

In captivity this rat showed a preference for soft fruits, and it would thrive on a diet of banana and sweet-potato. It would accept a large range of foodstuffs however. Like *R. canus* it is a tree rat, and is said never to be seen on the ground. Our specimens were very active, and fairly tameable, although if annoyed they would stand up on their hind legs screaming and chattering their teeth. They were nocturnal.

*Rattus whiteheadi* (Thomas). Whitehead's Rat.

This rat seems to have a variety of names, we have heard it referred to as (w) *tikus bankong*, *tikus berok*, *tikus loro*, and (s) *tikus lebong*, as is *R. rattus*.

Our specimens of this rat would eat nothing but sweet-potato, tapioca, and bones. They were fairly active and quite tame, and would readily sit on one's hand to be fed. They were nocturnal.

*Rattus rajah* group. Spiny-rat.

Trapper's name (w) *tikus jang* from the name of a fruit.

This rat is nocturnal and lives in burrows in the ground. In captivity it was a general feeder and was fairly active.

*Rattus sabanus* (Thomas). Giant-rat.

Trapper's name *tikus perah* from the name of a fruit.

These rats were general feeders, eating anything offered, including meat. They were rather nervous, but quite gentle and easily tamed. They were nocturnal.

*Atherurus macrourus* (Linn.). Brush-tailed Porcupine.

Trapper's name *landak batu*, rock porcupine, said to nest in holes in rocks.

Only two specimens of this porcupine have been kept by us. Offered a variety of vegetable food they showed a decided preference for banana, although sweet-potato and green vegetables were accepted. They were quite good-tempered and tamed easily. They were largely nocturnal, but were fairly active during the day.

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INSECTIVORA

*Tupaia glis* (Diard). Greater Tree-shrew.

Trapper's name *chong ulam*, the word *chong* being a generic term for ground squirrel (see *Callosciurus lowi*) *Ulam*, half boiled, is explained by the statement that the flesh tastes better only partly boiled, being bitter when well-boiled. We have not yet tried the flesh.

Although they accepted and obviously enjoyed insects in large quantities, these tree-shrews could be kept for long periods of apparent health on a diet of banana and other soft fruit only. Such hard foodstuffs as sweet-potato, groundnuts, and tapioca, were not accepted. In nature they appear to consume a mixed diet of fruit and animal food.

Tree-shrews are remarkably active animals throughout the day. When foraging they seem to utter from time to time a soft churring noise, rather like the growling of a kitten, but high pitched.

*Tupaia minor* Günther. Lesser Tree-shrew.

Trapper's name *chong kuet* an onomatopaeic name, also *chong ulam* as above.

Food as for *Tupaia glis*.

This tree-shrew is even more active than the last one, it seems almost incessantly in movement. A note which may be expressed as *shree* is uttered from time to time. We have found it very pugnacious, it will hiss at intruders, fiercely attack any object put into the cage, and bite freely.

*Ptilocercus lowii* Gray. Pen-tailed Tree-shrew.

Only a few specimens of this strange animal have been seen. They were almost entirely insectivorous, although a little banana was accepted. They were strictly nocturnal, and spent the day coiled up, usually in a 50-cigarette tin for which they developed a liking.

They were excellent climbers, and could cling to a vertical sheet of wood. At first they were rather fierce, but they soon became tame. When annoyed they would make a hoarse snarling hiss with mouth open, reminiscent of a Moonrat.

*Echinosorex gymnurus* (Raffles). Moonrat.

Trapper's name *tikus kukus*.

The Moonrat is clearly a fish eater. Specimens offered a variety of food would accept a little banana, but would eat



several hundred grams of fresh fish. Offerings of cockroaches, grasshoppers, and earthworms, were ignored. Presented with a trough of water about 6 cm. deep in which the mosquito-eating fish *Gambusia* were swimming the specimen tried out immediately plunged in and showed itself to be quite at home paddling about in the water and skillfully catching fish. In our experience specimens are usually trapped near streams, and it seems reasonable to suggest that they get their food by catching fish, and perhaps crustacea and mollusca.

Judging by reports they are entirely nocturnal, but our specimens were usually restless during the day. They were fierce and would greet any visitor with a harsh snarling made with open jaws. All specimens had a characteristic strong offensive smell resembling that of stale sweat.

*Hylomys suillus* Müller.

Short-tailed Shrew.

Trapper's name (s) *tikus chong batu*, literally the rock-groundsquirrel-rat, it is said to live in holes in rocks, and the face is characteristically like that of *Tupaia* and *Rhinosciurus*.

We have not enough experience of this animal to be certain of its food, but from what we have seen it is entirely insectivorous. Robinson & Kloss (1918) report stomach contents entirely of insects. We have not heard any noise from our specimens.

*Suncus caeruleus* (Kerr).

House shrew.

Trapper's name *chenchurut*. *Tikus sulah* and *tikus hantu* have also been given us but perhaps in reference to other shrews.

In captivity this house shrew would eat anything offered, we have had specimens accept such unlikely materials as biscuit, flour, and boiled rice. They show obvious preference however for insects, earthworms, and even nestling mice and rats.

#### DERMOPTERA

*Galeopterus variegatus* (Audebert).

Flying Lemur.

Trapper's name *kubong*.

In captivity these flying lemurs will accept soft fruit, although we have not tried to keep them alive for any length of time. The stomachs of specimens examined, however, invariably contain triturated leaves, as is noted by Robinson and Kloss (1909). Hunt (1950) records an observation of one seen feeding on the buds and leaves of a forest tree.

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CARNIVORA

*Paradoxurus hermaphroditus* (Pallas). Palm Civet.

Trapper's name *musang*.

Ridley (1930) gives a long list of the various seeds found in the droppings of this animal, which agrees with our finding that it will eat any soft fruit. Captive specimens will accept the bodies of small mammals and birds, and among the contents of stomachs examined we have found the remains of snails and the large black scorpion *Heterometrus longimanus*.

*Paguma larvata* Ham. Smith. Masked Palm-civet.

Trapper's name *musang*.

This species also accepts soft fruit, insects, and rats. Specimens kept by us have become very tame.

Summary

In the course of studying the hosts of the mite-vector of Scrub Typhus many small mammals have been observed and kept in captivity. Notes are given on the Sakai-names, food, and habits, of twenty-three rodents, six insectivores, two carnivores, and the flying lemur.

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