

PHYSICAL AND BEHAVIOURAL DEVELOPMENT OF THE JAPANESE DORMOUSE, *GLIRULUS JAPONICUS*

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ABSTRACT – The Japanese dormouse, *Glirulus japonicus*, is an arboreal, nocturnal hibernating rodent endemic to Japan. Shimoizumi described the hibernation (1939, 1940, 1943) and food (1933) of the Japanese dormouse, but there is otherwise very little information about the biology of this species. The present author performed extensive studies of reproduction in captive Japanese dormice. The physical and behavioural development, and the relationship between hibernation and ontogeny, as well as maternal care will be described here.

Key words: Behaviour, Physical development, Japan, *Glirulus japonicus*.

RIASSUNTO – *Sviluppo fisico e comportamentale del Ghiro giapponese Glirulus japonicus* – Il ghiro giapponese, *Glirulus japonicus*, è un roditore arboreo, notturno e ibernante endemico del Giappone. Shimoizumi ha fornito dati sul letargo (1939, 1940, 1943) e sull'alimentazione (1933) del ghiro del Giappone. Tuttavia le informazioni sulla biologia di questa specie sono scarse. L'autore ha condotto ampi studi sulla riproduzione in cattività del ghiro giapponese. Nel presente lavoro verranno descritti lo sviluppo fisico e comportamentale, la relazione tra letargo e ontogenesi e le cure parentali.

Parole chiave: Comportamento, Sviluppo fisico, Giappone, *Glirulus japonicus*.

The animals were reared in large cages (Type A: 1.8X2.4X2.2 m, Type B: 2.0X5.0X2.2 m, Type C: 2.0X4.1X2.5 m, Type D: 2.1X4.5X3.0 m), a medium-sized cage (Type E: 1.3X2.4X0.8 m), and small cages (Type F: 0.3X0.9X0.6 m) at Hongu and Kumanogawa, Wakayama. In this study, 17 pups (10 males and 7 females) from 6 litters were used for observation of physical and behavioural development. Pregnant females were observed daily for parturition. The day when newborn young were first observed was day 0 and the litter size was determined. Seven pups (5 males and 2 females) from 2 litters captured in the field in the winter were used for observation of development during the winter period.

The body weight increased steadily from day 0 to day 32, but this pattern was disturbed slightly during weaning. The principal events of development were as follows: the eyes opened at day 11-16 and the auditory meatus at day 12-15; the dorsum was fully covered with hair by day 5-8 and the venter by day 14-15; the lower incisor began to erupt at day 6 and the upper at day 7-10; the fore- and hind-digits separated perfectly at day 8-12 and day 10-13 respectively; righting began at day 1-4; clinging with four limbs started at day 2; crawling began at day 4; walking appeared from day 9 to day 13; sound reaction began at about day 15; weaning commenced at about day 19-20. Five steps of arboreal locomotion were observed.

For the Japanese dormouse, the period from day 0 to 32 was divided into five phases.

Phase 1 (day 0): the pups are unable to make any voluntary movement, and show no righting, pivoting, or backward crawling.

Phase 2 (day 1-11): do not react to sound, but are able to right, crawl backwards, pivot, then crawl forwards, walking awkwardly.

Phase 3 (day 12-17): their sensory and motor organs develop rapidly, eyes open and auditory meatuses also open and the animals react to sound.

Phase 4 (day 18-21): the pups come out of the nest, begin to acquire arboreal behaviour patterns and show exploratory behaviour. When weaned, they catch insects and eat, hanging from a branch, as the adult do.

Phase 5 (day 22-32): begin to chase and mount other pups on the tree.

It seems that the development of the Japanese dormouse is faster than that of other dormice. When the young hibernated, the average body weight was 22.2 g (range 18.7-23.8 g). The mother showed a variety of parental behaviours: exclusion of other dormice which approached her nest; addition of nest materials; construction of new nests and transfer of the young into the new nests, protection of nestlings, behaviour as the model for the young, and carriage of food to the nest.

The average pregnancy period was 32.8 days (range 30-39 days). Breeding occurred once or twice per year. The average litter size was 2.8 (range 2-4) in captivity.

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