

Breeding the Chinese Hamster
(Cricetulus griseus) as a Laboratory Animal

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Reprinted from the *Bios*, December, 1971, Volume XLII, Number 4

Introduction. The Chinese hamster (*Cricetulus griseus* Milne-Edw.) is rapidly becoming accepted as a new laboratory animal. This poorly known rodent of the Family Cricetidae has several characteristics that make it ideal for use as a laboratory research animal. These include a low chromosome number ($2N=22$), large chromosomes, suitability as an experimental host for a variety of parasites, and susceptibility to many human diseases, including tuberculosis, diphtheria, rabies, and influenza (Yerganian, 1958).

Chinese hamsters occur over much of China where they may damage crops and stored grain when population densities reach epidemic proportions (Yerganian, 1958).

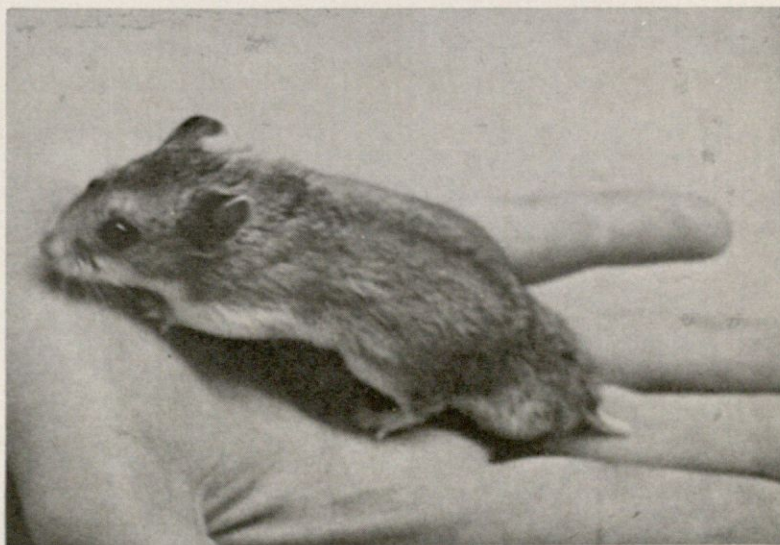


Fig. 1. Male Chinese hamster showing enlarged, fully descended testes.

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Despite their high reproductive potential, Chinese hamsters are difficult to breed in the laboratory. An aggressive female will attack the male during much of the four-day estrous cycle, except just prior to and during the two-hour "heat" period (Yerganian, 1958). Her primary target is the enlarged, fully descended testes of the male (Fig. 1). Often the male is injured or killed when a pair of breeding stock is not separated.

Methods and Materials. The following techniques were employed to develop a laboratory colony of suitable size for research purposes. An environmental chamber having a temperature ranging from 22-24°C and a reversed lighting scheme with 14 hrs. of light and 10 hrs. of darkness was used to house the hamsters. Reversed lighting (i.e., darkness beginning at 8:00 A.M.) allowed breeding trials to be conducted during the normal work day. The peak of hamster "heat" is reached approximately two hours after onset of darkness. Feeding, watering, and cleaning cages can be accomplished with minimal disturbance during their period of nocturnal activity. Animals in frequently disturbed colonies tended to be poor breeders.

Food and tap water were provided *ad libitum*. Deprived of water, hamsters dehydrate rapidly, usually resulting in cannibalism. Purina Chinchilla Chow supplemented with Purina Mouse Chow provided an apparently well balanced diet. Another suitable diet can be provided by fresh lettuce, sliced potatoes, and small crop grains, but these items are recommended more as a supplement to the commercially available laboratory feeds because they are less easily obtained.

Almost any type of cage can be used for housing hamsters as long as the screen is of fine enough mesh to prevent escape. Plastic tray cages proved to be excellent housing for males and non-breeding females. Breeding females were kept in larger cages having solid floors and were provided cotton for nesting material and wheels for exercise. Sawdust proved to be a good litter material.

The best criteria found for determining the peak of estrus were the appearance of the vaginal orifice and the behavior of the paired hamsters. To observe the vagina, the female hamster should be held firmly, but gently, with cupped hand. By holding the head with the thumb so that the hamster's back is next to the palm, one can carefully spread the back legs near the pelvic region with the other hand to place the vaginal orifice in plain view (Fig. 2). If the vagina protrudes outward forming two wrinkled reddish lips with a purple clitoral spot, the female is either approaching or in estrus. Once the occurrence of a period of heat has been determined, the female should be placed in the male's cage, but never the male into the female's cage. When the peak of estrus has been correctly identified, lordosis and copulatory attempts begin immediately. The pair can be left together for one to two hours to insure

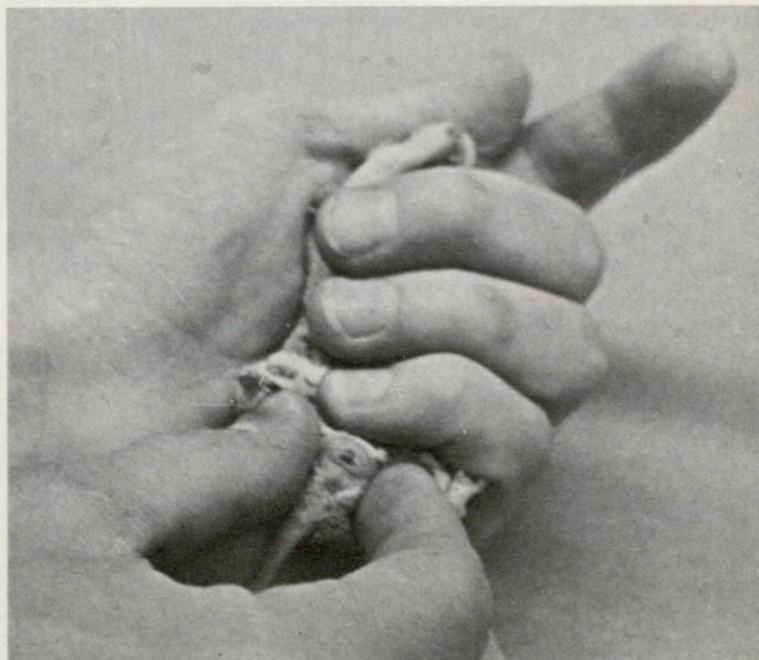


Fig. 2. Female Chinese hamster being held properly to determine peak of estrus.

a successful mating. If lordosis and copulatory attempts do not occur within 30 seconds, the female should be removed. A second trial may be attempted after two or three hours. If the peak of estrus was missed, observation and further breeding attempts should be repeated in three days. When a mating is successful, a copulation plug will form within a few hours. The estrous cycle is approximately $3\frac{1}{2}$ to $4\frac{1}{2}$ days (Yerganian, 1958). Losses resulting from fighting were eliminated by following this technique.

Results and Discussion. The average gestation period is 20 days, and young can be weaned at 24 days of age (Smith, 1957). Four young was the modal litter size in my colony, with extremes of two and seven.

Young animals are difficult to handle because they are easily frightened and will jump blindly from an open cage. As Chinese hamsters mature, they become docile and easily handled. Gloves are not recommended for handling members of this species. Bites were never inflicted on handlers and furthermore, the researcher needs greater dexterity than that afforded by gloves.

The Chinese hamster is one of the more difficult laboratory animals to breed, but with persistence and the proper techniques, a colony of hamsters suitable for laboratory research can be maintained.

Acknowledgments

I would like to thank Drs. Lund and Martin, both of Kearney State College, and Dr. Birney of the University of Minnesota for their assistance in preparation of the manuscript and my wife, Becky, for her help and encouragement.

Literature Cited

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