Laboratory Animal Resource Center
TTUHSC El Paso
Policy Regarding Rat Breeding and Housing Density

The research staff has primary responsibility for checking for pregnancy and birth and for recording these events on the cage card(s).

After pups are born, the cage is left undisturbed for at least three (3) days except for replenishing of food and water as needed. In case the bedding gets very dirty or wet and the cage must be changed sooner, the following procedure will be followed. The female is transferred first, and then the litter plus a small amount of the dirty bedding (so the smell in the new cage will be familiar) is scooped up altogether with a gloved hand and transferred to the new cage. The same procedure is followed until the pups start moving around the entire cage.

Multiple different breeding schemes are acceptable and should be included in the IACUC protocol. In any case, the research staff is responsible for carefully monitoring pregnancies.

Monogamous pairs

Postpartum estrus occurs within 24 hours of parturition; thus if a male is left in the cage, the female is likely to become pregnant again while lactating and nursing the new litter.

Monogamous continuous

Male and female left in cage with pups: pups must be weaned on a timely basis (19 to 21 days) to prevent overcrowding, which would occur with 2 litters of different ages in the cage with the parents.

- A preferred method to prevent overcrowding
- Offers an extended nursing time for inbred strains known to be small and slow growing
- Maximizes productivity of females by utilizing post---partum estrus; allows for the identification of the dam for the litter

Monogamous non-continuous: Male is removed AFTER the litter is born.

One male and one female are housed together for mating. Nesting material is provided in the cage. The rats are not separated when the female becomes pregnant or delivers the pups. To provide more space for the pups, the male is removed at first cage change after parturition. This model takes advantage of postpartum estrus and allows the female to become pregnant and nurse at the same time. Litters are born approximately 21 days apart. The 3-week old litter must be weaned prior to the birth of the new litter.

Monogamous non-continuous: Male is removed BEFORE the litter is born

One male and one female are housed together for mating. Nesting material is provided in the cage. When the female is noticeably pregnant the male is removed from the cage.

- A preferred method to prevent overcrowding
- Offers an extended nursing time for strains known to be small and slow-growing
- Maximizes energy available for support of lactation

Trio mating

This method houses two (2) females in a cage with one male.

During routine health/breeding checks, each noticeably pregnant female is removed and placed in her own cage. When the pregnant female is separated from the cage, she is given nesting material in her delivery cage to make a nest for her pups. Female delivers her pups and nurses them for 21 days. Only one nursing female and litter is allowed per cage. After the pups are weaned, the female may be returned to a trio breeding cage.

WEANING PUPS

Weaning age for rat pups is routinely 21 days of age. In the case of some inbred, genetically modified or mutant strains, it may be advantageous to allow the pups to remain with the female for 28 days. This must be approved in the protocol, or on a case-by-case basis by the facility veterinarian.

Allowing a 3 week old litter to stay in the cage with a lactating female that also has a newborn litter is NOT permitted.

Monogamous pairs - Assuming the lactating mother is pregnant, pups are weaned at 20-21 days of age, just before the new litter is born. This will prevent trampling of newborn pups by the weanling pups, and prevent the cage from being overcrowded.

Trio mated females - If a singly housed lactating female is alone in a cage with her litter, rat pups are routinely weaned at 21 days of age unless an exception has been approved by the IACUC or the facility veterinarian (based on medical necessity).

Separation of sexes at weaning - Male and female pups are separated at the time of weaning, rats of each sex being placed in a separate cage. It is recommended that sexing of the pups be verified one week later.

DEFINING RESPONSIBILITY FOR SEPARATING AND WEANING RATS

The research staff is responsible for cage card documentation and for separating and weaning according to the above guidelines unless previous arrangements have been made with LARC.

Non-breeding experimental rats are separated as needed by the research staff, unless technical support has been arranged with LARC in advance.

LARC ACTIONS WHEN PI-MANAGED CAGES HAVE BECOME OVERCROWDED (O/C)

The LARC Staff checks for O/C and pregnancy when changing cages. Any cages that are overcrowded according to the standards defined above are marked with a Sick/Dead/Other or Please Wean card, dated and initialed.

When overcrowding is noted, the Research Staff is given 48 hours to correct the problem, depending on the severity of the overcrowding

* NOTE: WEEKENDS AND HOLIDAYS COUNT AS DAYS AND ARE NOT EXEMPT.

If overcrowding is not addressed within the allotted time, LARC staff separates the rats and charges the PI.

When two litters, one newborn and one older, are in one cage, separation is performed as soon as possible. In such a case, the LARC Staff separates the older pups into a separate cage and provides food on the cage floor. Female and new pups are left in the breeding cage.

*Any time a cage is significantly overcrowded and the welfare of the animals is at stake (Emergency O/C), the animals are promptly separated into acceptable group sizes and Research Staff is notified via email. Please see the LARC Policy on Overcrowded Cages for more details.

HOW MANY RATS ARE ALLOWED PER CAGE

Rats are social animals and because male rats rarely fight, with the notable exception of retired breeders, every effort must be made to group-house rats whenever it does not interfere with the experimental design. Post-operative rats may or may not be group-housed, again depending on their postoperative needs and the experimental design.

Note that the following table is based on the recommendations set forth in the 7th edition of the Guide for the Care and Use of Laboratory Animals, as the benefits gained from social housing of the larger animals are felt to outweigh the benefits gained from additional space. Cages will be spot changed as necessary to maintain sanitation standards. However, densities have been decreased to prevent the need for off-cycle spot changes.

Guidance for Housing Rats

Rat weight	# rats of this weight in an ACS cage
100g	8
up to 200g	6
up to 300g	5
up to 400g	4
up to 500g	2
>500g	2
female + litter	1 female + litter

Personnel that are found to be in violation of this policy will be reported to the IACUC.

Related Information

PHS Policy on Humane Care and Use of Laboratory Animals
http://grants.nih.gov/grants/olaw/references/phspol.htm

The Guide for the Care and Use of Laboratory Animals, 7th Edition
http://www.nap.edu/openbook.php?record_id=5140

The Guide for the Care and Use of Laboratory Animals, 8th Edition
http://www.nap.edu/catalog.php?record_id=12910

USDA Policy #3: Veterinary Care http://www.aphis.usda.gov/animal_welfare/policy.php?policy=3

References

http://www.bu.edu/orccommittees/iacuc/policies-and-guidelines/rodent-breeding-colony-management-rats/

The Guide for the Care and Use of Laboratory Animals. 1996. NRC ILAR. P.27. Table 2.1. Recommended Space for Commonly Used Group-Housed Laboratory Rodents. LARC Standard

Operating Procedures (SOPs).

UMDNJ New Jersey Medical School Comparative Medicine Resources Rodent Breeding Policy and Standard Operating Procedures (SOPs).