MICHIGAN STATE UNIVERSITY | Institutional Animal Care and Use Committee

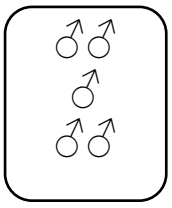
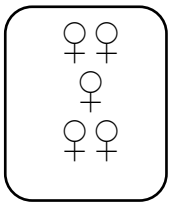
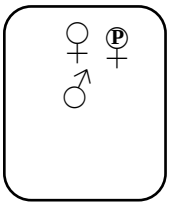
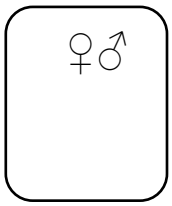
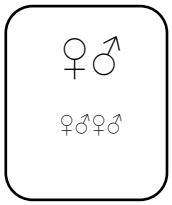
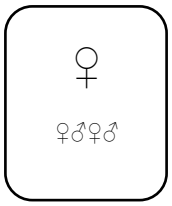
Guideline Number	IG009
Approved By:	IACUC
Approval Date:	04/13/2023
Version Number:	8

BREEDING PROCEDURES AND CAGE DENSITY GUIDELINES FOR MICE AND RATS

The National Research Council (NRC) "*Guide for the Care and Use of Laboratory Animals*" (2011) provides recommended minimum housing space expectations for laboratory mice and rats (p.57). These rodents are social species and should be housed together, unless scientifically justified for individual housing.

MICE:

The following table depicts the number of mice allowed in one standard rodent cage using the floor area limitations stated in the *Guide*. Oversight for colony management is the responsibility of the research investigators, unless arranged differently as a fee for service by Campus Animal Resources (CAR).

MAXIMUM MICE PER BOX Standard Mouse Cage (Optimice, Innovive, shoebox) (floor: 75 sq. in.)					
Adult Mice		**Breeding Arrangement**		**Birthing Arrangement**	
					
Males only: Up to 5 males may be housed together (non-breeding cage). *Note that cohoused male mice are prone to fighting and may require separation smaller groups or into individual cages.*	**Females only:** Up to 5 females may be housed together (non-breeding cage).	**Trio Breeding:** One male* and 2 females may be housed together for breeding. When pregnancy is identified in female(s), one female is to be removed prior to parturition. *Until pups are delivered, the singly housed female is to be provided with additional enrichment and a singly housed sticker placed on the cage card (per IG046: Guideline on Animal Enrichment).*	**RECOMMENDED Monogamous Pair:** One male and one female may be housed together and continue cohousing after the birth of a litter.	**Monogamous Pair:** One male and one female may be housed together with one litter. Litter must be weaned by 28 days. If second litter is birthed, the older litter should be weaned.	**Female and pups:** One female and one litter. Litter must be weaned by 28 days, unless there is a scientific justification.
♂ = adult male, ♀ = adult female, ♀♂♀♂= one litter, Ⓟ♀ = pregnant female					

PERMISSIBLE BREEDING CAGE ARRANGEMENTS FOR MICE**:

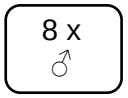
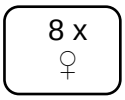
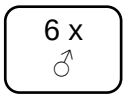
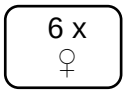
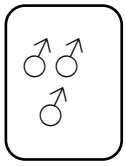
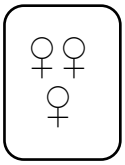
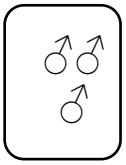
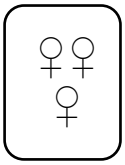
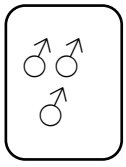
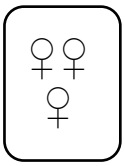
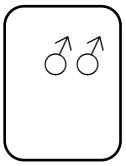
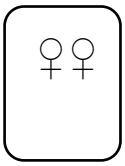
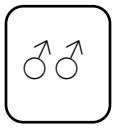
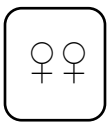
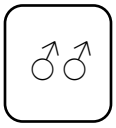
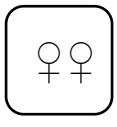
- ➢ Monogamous pairing (1 male + 1 female + litter to weaning) or trio breeding* (1 male + 2 females) separated to female and pups and monogamous pairing once litter is born.
- ➢ Litters must be weaned by 28 days. If clinical issues arise, contact CAR veterinary staff.
- ➢ Pups are to be removed and separated by sex by laboratory staff.

**ONLY one male should ever be placed in a breeding cage to avoid fighting and injury to cage mates*
**Use of trio breeding should be considered carefully, and is generally only recommended for quickly increasing colony size or generating many animals for study use.*

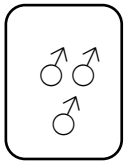
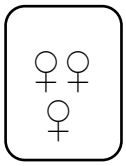
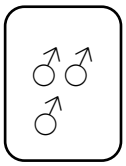
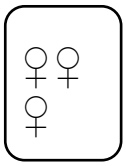
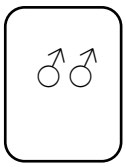
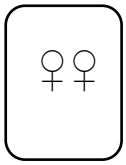
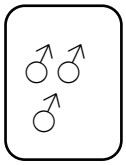
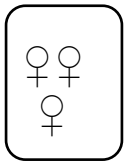
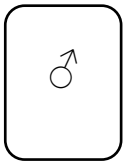
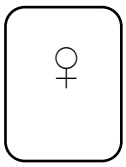
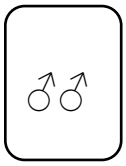
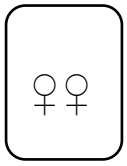
*****Harem breeding (1 male + 3-4 females) is strongly discouraged** due to challenge of monitoring for overcrowding cages and injury to pups.*

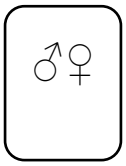
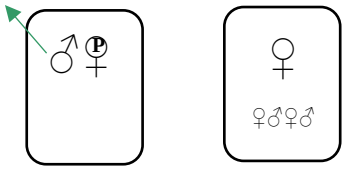
RATS:

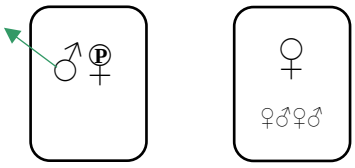
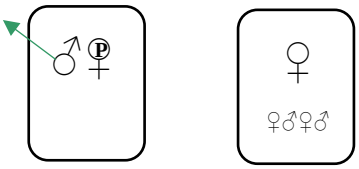
The following tables depict the number of rats allowed in cage using the floor area limitations stated in the *Guide*. Oversight for colony management is the responsibility of the research investigators, unless arranged differently as a fee for service by CAR.

MAXIMUM ADULT RATS PER BOX – Standard and Allentown				
Weight Range	**Standard box cage (floor: 190 sq. in)**		**Allentown cage (floor: 142 sq. in)**	
Up to 200g				
	Males only: Up to 8 males may be housed together	**Females only:** Up to 8 females may be housed together	**Males only:** Up to 6 males may be housed together	**Females only:** Up to 6 females may be housed together
201-400g				
	Males only: Up to 3 males may be housed together	**Females only:** Up to 3 females may be housed together	**Males only:** Up to 3 males may be housed together	**Females only:** Up to 3 females may be housed together
401g-500g				
	Males only: Up to 3 males may be housed together	**Females only:** Up to 3 females may be housed together	**Males only:** Up to 2 males may be housed together	**Females only:** Up to 2 females may be housed together
>500g				

	Males only: Up to 2 males may be housed together	**Females only:** Up to 2 females may be housed together	**Males only:** Up to 2 males may be housed together	**Females only:** Up to 2 females may be housed together

MAXIMUM ADULT RATS PER BOX – Optirat and Optirat Plus				
Weight Range	**Optirat cage (floor: 135 sq. in)**		**Optirat Plus cage (floor: 183 sq. in)**	
Up to 200g				
	Males only: Up to 5 males may be housed together	**Females only:** Up to 5 females may be housed together	**Males only:** Up to 7 males may be housed together	**Females only:** Up to 7 females may be housed together
201-400g				
	Males only: Up to 3 males may be housed together	**Females only:** Up to 3 females may be housed together	**Males only:** Up to 3 males may be housed together	**Females only:** Up to 3 females may be housed together
401g-500g				
	Males only: Up to 2 males may be housed together	**Females only:** Up to 2 females may be housed together	**Males only:** Up to 3 males may be housed together	**Females only:** Up to 3 females may be housed together
>500g				
	Males only: Male must be housed singly	**Females only:** Female must be housed singly	**Males only:** Up to 2 males may be housed together	**Females only:** Up to 2 females may be housed together

BREEDING ARRANGEMENT – Standard Rat and Allentown	
Standard box cage (floor: 190 sq. in)	**Allentown cage (floor: 142 sq. in)**
	
Monogamous Pair: One male and one female may be housed together and continue cohousing after the birth of a litter.	**Monogamous Pair:** One male and one female may be housed together for breeding. Male must be separated prior to birth of litter. Litter is to be weaned by 21 days.
♂ = adult male, ♀ = adult female, ♀♂♀♂ = one litter, Ⓟ = pregnant female	

BREEDING ARRANGEMENT – Optirat and Optirat Plus	
Optirat cage (floor: 135 sq. in)	**Optirat Plus cage (floor: 183 sq. in)**
	
Monogamous Pair: One male and one female may be housed together for breeding. Male must be separated prior to birth of litter. Litter is to be weaned by 21 days.	**Monogamous Pair:** One male and one female may be housed together for breeding. Male must be separated prior to birth of litter. Litter is to be weaned by 21 days.
♂ = adult male, ♀ = adult female, ♀♂♀♂ = one litter, Ⓟ = pregnant female	

PERMISSIBLE BREEDING CAGE ARRANGEMENTS FOR RATS**

- Monogamous pairing is the only option for rat breeding arrangements.
- Litters must be weaned by 21 days. If clinical issues arise, contact CAR veterinary staff.
- Pups must be removed and separated by sex by laboratory staff.

***Optirat and Allentown cages will not accommodate 2 adults and a litter; male must be removed from cage prior to delivery of pups*.

BREEDING CAGE CARDS

Breeding cage cards should include the following information: Investigator, animal strain, date of birth, number of pups in litter, sex (if possible to ascertain at a young age).

OVERCROWDED RODENT CAGES AND WEANING

If cages are noncompliant with breeding arrangements, CAR staff will notify the research investigator via email. Research investigator or laboratory staff will then have one business day to wean the pups. Pups not weaned within one business day following notification of overcrowded cage, will incur a service charge and CAR will wean/separate. Frequent and recurrent notifications regarding breeding colony management will result in a breeding management

charge. CAR management of breeding colonies may become necessary if, despite several notifications from CAR and re-training of laboratory staff, breeding issues are ongoing. CAR veterinary staff retains the right to request weaning and separation of animals in rodent cages on a case by case basis, as needed to uphold animal welfare expectations.